

BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense

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J. R. SCHRAMM, Editor-in-Chief
Cornell University, Ithaca, New York

Vol. IX

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No. 2

ENTRIES 577-1100

AGRONOMY

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(See also in this issue Entries 735, 873, 911, 916, 931, 941, 959, 961, 966, 1009, 1030, 1050, 1051, 1069, 1070, 1086)

577. ANONYMOUS. Destrucción de las malas yerbas. [Weed destruction.] Rev. Agric. [Mexico] 4: 414-415. 3 fig. 1919.—Popular.—*John A. Stevenson.*

578. ANONYMOUS. Emparve de trigos. [Stacking of wheat.] Defensa Agric. [Uruguay] 1: 309-315. 5 fig. 1920.—Taken from Bull. 34 Inspección Nacion. Ganaderia y Agric. Uruguay.—*John A. Stevenson.*

579. ANONYMOUS. Flax cropping. North Dakota Agric. Exp. Sta. Ext. Circ. 44. 4 p. 1921.—A popular treatment of the subject is presented.—*L. R. Waldron.*

580. ANONYMOUS. Home grown wheat. Nature 107: 89-90. 1921.—Increase of yield is much needed and is to be sought by use of improved varieties and fertilizers. Experiments seem to favor fall sowing.—*O. A. Stevens.*

581. ANONYMOUS. Local results with Glencope wheat. Agric. Gaz. New South Wales 32: 248. 1921.—Glencope wheat was originated by Mr. Cope in South Australia. Trial at Temora showed it to be comparatively low yielding.—*L. R. Waldron.*

582. ANONYMOUS. Plantas forrajeras. [Forage plants.] Informacion Agric. [Madrid] 11: 140-142. 3 fig. 1921.—*Trifolium pratense*, *T. hybridum*, and *Brassica napus* (colza or rape) are recommended as forage crops.—*John A. Stevenson.*

583. ANONYMOUS. That early blooming sweet clover. Amer. Bee Jour. 61: 142-143. 1921.—A description is given of an early-blooming variety of white sweet clover (*Melilotus alba*). It is reported to mature its seed 3 weeks before the common white form. It grows to a good height, ripens before the weeds, is a heavy seed producer, is a superior soil improver, and is usually hardy.—*J. H. Lovell.*

584. ANONYMOUS. Une nouvelle plante pour l'engrais vert. [A new green manure plant.] Jour. Sta. Agron. Guadeloupe 1^{re}: 14-15. 1920.—A field test with *Sesbania sericea* DC. as a green manure crop is briefly described. A chemical analysis of the crop is reported and the trial planting is said to have yielded at the rate of 117.74 lbs. of nitrogen per acre.—*J. D. Luckett.*

585. AHR, UND CHR. MAYR. *Grundlagen der Wiesen-Düngung.* [The fundamentals of fertilizing meadows.] 159 p. F. P. Datterer & Cie.: Freising, 1919.—Meadows furnish the greater part of the winter feed in Bavaria. Among the chief means for securing increased yields is the application of fertilizers, and the authors give in the first 87 pages an account of the fertilizer experiments carried on from 1912 to 1916 with nitrogen, phosphoric acid, and potash in different combinations and from different sources. It was found that the use of commercial nitrogenous fertilizers did not pay. When a meadow was properly supplied with lime, potash, and phosphate the yields were as good, and the amounts of nitrogen in the hay as high, as when commercial nitrogen was used.—In the 3rd and 4th sections, the authors discuss the fertilizer utilization and the fertilizer balance in the fertilizing of meadows as well as how to determine the manurial requirements, in which analyses of the hay for potash and phosphorus content can be very helpful. The authors quote with approval the statement of PAUL WAGNER that if the hay contains in the vicinity of 2 per cent potash or around 0.65 per cent phosphoric acid, further applications of these substances will not increase yields; but they call attention to important limitations in the application of this conclusion. Not only must the chemical analysis be constantly checked by a botanical determination of the species occurring and a separation of these into grasses, clovers or other legumes, and herbs, but the previous conditions of the meadow must be taken into account. Further care must be taken that the material for chemical analysis be carefully selected from the freshly cut meadow and not from the hay after it has been exposed to the weather.—A. J. Pieters.

586. AHR, J., UND CHR. MAYR. *Düngungseinflüsse auf Ertrag und Güte von Gerstensorten.* [Influence of fertilizer on yield and quality of barley varieties.] 124 p. F. P. Datterer & Cie.: Freising, 1919. Two years' results of pot tests of various fertilizers on different varieties of barley are reported. Six varieties of barley were used, as follows: 2 selections of Upper Bavarian, a Lower Bavarian, a Danubian, a 4th Bavarian and a Lower Frankish. Each of these received 10 different treatments: Unfertilized; single applications of nitrogen, phosphorus, potash, or lime; application of pairs of fertilizers, nitrogen and phosphorus, nitrogen and potash, and potash and phosphorus; complete fertilizer with lime; complete fertilizer without lime.—The plants showed a strong reaction to nitrogenous and phosphatic fertilizers. Nitrogen alone, while it stimulated culm production and increased yield, was not a satisfactory fertilizer as the quality of the grain was not good. Phosphorus and potash without nitrogen gave a good quality of grain, but the yield was greatly increased and the quality remained good when nitrogen and lime were added. Too much nitrogen is not desirable from the Bavarian point of view. The smaller kernels were highest in nitrogen, the larger highest in starch.—H. V. Harlan.

587. AMEND, FRIEDRICH WILHELM. *Untersuchungen über flämischen Roggen unter besonderer Berücksichtigung des veredelten flämischen Landroggen und seiner Züchtung.* [Investigations of Flemish rye with special reference to the improved Flemish "land" rye and its breeding.] *Landw. Jahrb.* 52: 615-670. 1919.—The small farmers of West Flanders have developed through selections in the old Flemish "land" rye, a new variety, which, while retaining the good qualities of the old, is improved in yielding ability, kernel weight, resistance to lodging, and ratio of grain to straw. Studies of the original and the improved sorts show that clubheadedness is correlated with density of heads and shorter kernels, but not with green color of kernels. Length of head is positively correlated with kernel weight and negatively with density. The short dense head shows slightly more sterility than the more loosely formed head. Kernel color and kernel quality are closely related, green color being preferable to brown. Form of head and culm development are closely related, short heads, each with a short peduncle, generally accompanying short culms. The degeneration of foreign ryes in Flanders is due to the maritime climate, which interferes with normal development.—C. E. Leighty.

588. AMES, C. T. Cotton experiments at the Holly Springs Branch Experiment Station seasons of 1919 and 1920. *Mississippi Agric. Exp. Sta. Bull.* 192. 10 p. 1920.—Results from variety tests on hill and valley land, fertilizer tests, and cotton spacing experiments are given;

also, certain suggestions in regard to cotton culture in the brown loam belt of north Mississippi. Cleveland, Miller, and Triumph are recommended for hill, and Wannamaker-Cleveland, Trice-270-41, and Express for valley land. Acid phosphate at the rate of 200 lbs. per acre and all forms of nitrogen gave paying results.—*H. B. Brown.*

589. AMES, C. T. Experiments with corn at the Holly Springs Branch Experiment Station. Mississippi Agric. Exp. Sta. Bull. 189. 8 p. 1920.—This report gives in brief results from corn variety and fertilizer experiments conducted at the North Mississippi Experiment Station from 1912 to 1920. Corn culture suggestions are also given. Nitrogen fertilizers were the only ones that gave consistently profitable gains.—*H. B. Brown.*

590. AMES, C. T. Report from Holly Springs Branch Experiment Station for 1915 to 1920 inclusive. Mississippi Agric. Exp. Sta. Bull. 193. 22 p., 2 fig. 1920.—This report gives in brief results from corn and cotton variety tests, cultural and fertilizer experiments, and results from experiments with sweet potatoes, Bermuda grass, bur clover, crimson clover, velvet beans, cowpeas, alfalfa, and dairying.—*H. B. Brown.*

591. AYRES, W. E. Corn variety tests 1913 to 1920 at the Delta Branch Station. Mississippi Agric. Exp. Sta. Bull. 198. 7p. 1921.—In the corn variety tests Cocke's Prolific, Ewing's Mosby, Hasting's Prolific, Woodruff's Mosby, and Vardaman were the highest yielding varieties.—*H. B. Brown.*

592. AYRES, W. E. Cultural experiments with cotton at the Delta Branch Station. Mississippi Agric. Exp. Sta. Circ. 35. 4 p. 1921.—Unthinned rows yielded most, but the use of this form of culture is not practicable on account of the difficulty of keeping down weeds. Rows 4 feet apart are considered best with plants 8 inches apart in the row. Factors are given for determining yields when the number of bolls on a 30-foot row is known.—*H. B. Brown.*

593. AYRES, W. E. Varieties of cotton 1919 and 1920 and summary of ten years' results, 1911-1920, at the Delta Branch Station. Mississippi Agric. Exp. Sta. Circ. 36. 4 p., 1 fig. 1921.—In the experiments with cotton Express, Foster, Wannamaker-Cleveland, Lone Star, Webber-49, Trice, Sunflower, Columbia, Triumph, and Miller varieties led in money value per acre in the order given.—*H. B. Brown.*

594. BREAKWELL, E. The production of better seed in other countries. Agric. Gaz. New South Wales 32: 245-248. 1921.—Methods of crop improvement in Sweden and methods of improved seed increase and dissemination in Sweden and Canada are briefly described.—*L. R. Waldron.*

595. BRENCHLEY, W. E. Indian agriculture. Nature 107: 58-59. 1921.—A brief review of several papers is presented. India is a land of small cultivators who are intensely conservative, usually poor, and unable to take risks in the adoption of new methods. Fertilizers and control of crop pests are especially needed.—*O. A. Stevens.*

596. BROWN, H. B. Corn experiments. Mississippi Agric. Exp. Sta. Bull. 197. 20 p., 2 fig. 1921.—A brief report is presented of certain corn experiments conducted in east-central Mississippi from 1911 to 1920. Cocke's Prolific, Tennessee Red Cob, Vardaman, and Paymaster were the best yielding varieties for early planting, and Laguna, Mexican June, and Goliad for late planting. Inbreeding gave poor-yielding strains; F₁ hybrids of commercial varieties gave but slight gains over their parents. No commercial fertilizers except those containing nitrogen were profitable.—*H. B. Brown.*

597. BROWN, H. B. Why not plant home grown cotton seed? Mississippi Agric. Exp. Sta. Circ. 37. 4 p. 1921.—Tests show that seed from varieties grown within the State produce better-yielding progenies than seed grown in other states.—*H. B. Brown.*

598. BROWN, H. B., AND C. B. ANDERS. Cotton experiments 1919 and 1920. Mississippi Agric. Exp. Sta. Bull. 187. 32 p., 4 fig. 1920.—A review is presented of results from a study of leading upland varieties of cotton during 1919 and 1920, with an outline of the environmental conditions under which the tests were made; also of certain fruiting studies, boll weevil control experiments, cotton culture suggestions, and of the relation of oil content of cotton seed to length of lint, size of seed, lint percentage, and nitrogen content of seed. Long staple varieties led in money value, with Foster-120-631 heading the list. A positive correlation was found between oil content of seed and length of lint, and a negative correlation between oil content and size of seed, lint percentage and nitrogen content.—*H. B. Brown.*

599. BROWN, W. ROBERTSON, W. H. HARRISON, AND P. B. SANYAL. Windrowing sugarcane in the Northwest Frontier Province. Part I. The effect on the economical and agricultural situation. Part II. The effect on the composition of sugarcane. Mem. Dept. Agric. India Chem. Ser. 5: 237-246. 1920.—Storage of sugarcane by windrowing, a farm operation practiced to prevent freezing of stalks, can be successfully carried out in the Peshawar Valley. Windrowing tends to bring about a deterioration of the juice, but at the same time causes a concentration of the juice so that the amount of crystallizable sugar per unit of juice remains approximately constant. The weight of sucrose and crystallizable sugar in windrowed cane increases rapidly at first, followed by a period when the values remain constant, after which deterioration sets in. The length of the period during which cane can be stored varies with the season.—*J. J. Skinner.*

600. BURTT-DAVY, JOSEPH. Utilizing prickly pear and spineless cactus. Their value as fodder for live stock. South African Jour. Indust. 3: 1000-1011. 1920.—The author discusses the utilization of prickly pear and spineless cactus under South African conditions, and brings out the fact that, because of its high water content, it is of especial value in time of drought. As a roughage with more concentrated feed for feeding cattle and as an accessory to the dairy rations when fed with more concentrated foods and some hay or pasture, prickly pear supplies succulence difficult to secure in semi-arid regions during a large period of the year. Working oxen can be maintained for an indefinite period on a ration consisting very largely of prickly pear. Methods of removing the spines, preparation of the cactus as a feed, and chemical analyses are given. The danger of prickly pear becoming a serious pest is pointed out.—*Mary R. Burr.*

601. CORREIA AFONSO, PEDRO. A adubação dos arrozais em teoria na pratica. [Theory and practice of rice fertilization.] Bol. Agric. [Nova Goa, Portuguese East India] 1: 229-243. 1919.—A very general discussion is presented of rice fertilization both with chemical fertilizers, such as phosphates, and green manure crops. *Crotalaria*, *Dolichos*, *Phaseolus* spp., and *Sesbania* are mentioned in particular in the latter connection. Tables giving the chemical composition of the various fertilizers discussed are given.—*John A. Stevenson.*

602. CORREIA MENDES, F. C. Relatorio de alguns serviços mais importantes a cargo da direcção dos serviços agricolas e florestais. [Report of the more important projects of the agriculture and forestry service.] Bol. Agric. [Nova Goa, Portuguese East India] 1: 215-229. 1919.—An account is given of the introduction of seed rice of improved varieties from British India for the purpose of improving rice culture in Portuguese India.—*John A. Stevenson.*

603. ELORDUY, SAMUEL T. Algunas indicaciones a los cultivadores de maiz. [Hints to corn cultivators.] Rev. Agric. [Mexico] 5: 344-349. 10 fig. 1920.—A popular account is given of seed selection as a means of improving the corn crop of Mexico.—*John A. Stevenson.*

604. FERRIS, E. B. A report of work at McNeill Branch Experiment Station from 1912 to 1917 inclusive. Mississippi Agric. Exp. Sta. Bull. 188. 23 p. 1920.—A brief report is presented of experiments with fruits, vegetables, cotton, corn, sorghum, cowpeas, soybeans, velvet beans, oats, wheat, sweet potatoes, and fertilizers at McNeill, in south Mississippi.—*H. B. Brown.*

605. FERRIS, E. B. Cotton growing in south Mississippi. Mississippi Agric. Exp. Sta. Bull. 196. 8 p. 1920.—Cotton yields in south Mississippi are very uncertain on account of heavy boll weevil damage. Trice is the best variety, and Cleveland probably next. 300 lbs. acid phosphate per acre and some nitrogen carrier are recommended as fertilizers.—H. B. Brown.

606. FERRIS, E. B. Report from south Mississippi Branch Experiment Station for 1918 to 1920 inclusive. Mississippi Agric. Exp. Sta. Bull. 194. 23p. 1920.—This report gives a history of the South Mississippi Station and results from experiments conducted in 1919 and 1920.—H. B. Brown.

607. FORTUN, GONZALO M. Cultivo de la caña de azucar en Cuba. [Sugarcane cultivation in Cuba.] Rev. Agric. [Mexico] 4: 421-426. 1919.—Popular.—John A. Stevenson.

608. GIROLA, CARLOS D. Algo sobre cuestiones forrajeras. [Forage crop problems.] Publ. Mus. Agric. Republica Argentina 22: 1-7. 1920.—Careful consideration should be given to the problem of providing pasturage to maintain and increase the live stock industry of Argentina, which in 1918 had a total export value of 500,000,000 pesos gold. Various plants, among them *Atriplex semibaccata*, *Polygonum sachalinense*, *Symphytum asperum*, and various of the sorghums have been exploited but are unsatisfactory except under especial limited conditions. Alfalfa will take first rank among the forage crops of the country with a planted area of 10,000,000 hectares. Rye grass, brome grass, the Paspalums and other grasses have proven satisfactory when properly cultivated.—John A. Stevenson.

609. GUTHRIE, F. B. Analyses of lucerne and tree-lucerne. Agric. Gaz. New South Wales 32: 238. 1921.—Analyses showed that the 2 plants are similar in composition.—L. R. Waldron.

610. HARLAN, HARRY V., AND STEPHEN ANTHONY. Effect of time of irrigation on kernel development of barley. Jour. Agric. Res. 21: 29-45. 20 fig. 1921.—“At Aberdeen, Idaho, deposit of dry matter in the barley (*Hordeum*) kernel continues until very near the point of absolute ripeness. The plants are able to utilize water up to the date of full maturity.” Late irrigation results in a later maturity. Shortage of water even when the spikes are turning yellow stops the depositing of dry matter. Shortage of water during the early development of the kernel probably determines the size of the kernel, even before the rate of depositing of dry matter is checked.—D. Reddick.

611. HARTH, E. Zwiebelanbauversuche im Jahre 1920. [Onion culture investigations in 1920.] Mitteil. Deutsch. Landw. Ges. 36: 254-257. 1921.—Four varieties of onions were tested in 7 sections. Much of the information is given in tabular form and covers shape, size, and color of bulb, and yields of marketable and unmarketable bulbs.—A. J. Pieters.

612. HAYWOOD, A. H. The culture of sugar cane in New South Wales. Agric. Gaz. New South Wales 31: 773-780, 853-859. 1920; 32: 28-32, 181-184, 257-260. 13 fig. 1921.—The area devoted to sugarcane is along rivers on the north coast of New South Wales. The acreage in 1895 was 33,000, which was gradually reduced to 11,000 by 1917; yield of sugar per acre has increased. The author discusses various phases of sugar cane culture in common practice from the preparation of the land to the harvesting of the crop. Important varieties are described, and some of these are figured. Four diseases,—gumming, leaf-scald, Fiji disease, and yellow stripe,—are described and discussed as to prevention and control.—L. R. Waldron.

613. JONES, D. F. Connecticut round tip tobacco. A new type of wrapper leaf. Connecticut [New Haven] Agric. Exp. Sta. Bull. 228. 287-292, pl. 16-17, fig. 1-4. 1921.—A description of a new variety of tobacco developed by hybridization and selection is given. The tip of the leaf is round permitting the cutting of a larger number of wrappers than can be had from the leaf of the varieties usually grown in the state. Field tests on farms for 4 years indicate that the variety is productive and has merit as a wrapper leaf.—Henry Dorsey.

614. JURITZ, CHAS. F. Prickly pear as a stock food. Jour. Dept. Agric. Union of South Africa 1: 848-851. 1920.—The author states that prickly pear has been of service in South Africa for ostriches, oxen, and pigs. During drought, prickly pear forms a valuable emergency ration but cannot be advantageously fed to stock unless mixed with more concentrated food; to the latter it is a valuable accessory.—*Mary R. Burr.*

615. KENNEDY, E. W. Wheat varieties under trial. Agric. Gaz. New South Wales 32: 241. 1921.—Yields are given of 4 wheat varieties at Condobolin Experiment Farm.—*L. R. Waldron.*

616. KHOLS, G. Steigerung der Ernteerträge durch vervollkommnete Bodenbearbeitung und Saatenpflege. [Increased yields by perfect soil preparation and care of seed.] Mitteil. Deutsch. Landw. Ges. 36: 225-235. 1921.—A review is presented of work done in 1911-1914, in the cultivation of grain. The author shows that the use of a press drill and of a special cultivator (Hack maschine) was advantageous, especially for wheat. Although the weed problem is not discussed the author quotes with approval a statement of RÜMKER: "He who cultivates, to destroy weeds, generally cultivates too late to derive the full profit from his labor."—*A. J. Pieters.*

617. KOCH, PIETER. Seed selection of tobacco. Sun and Agric. Jour. South Africa 11: 44-47. 1920.—The author discusses the characters to be kept in mind when selecting different types of tobacco, and gives notes with illustrations on the technique of bagging and grading.—*A. J. Pieters.*

618. McCAULEY, C. Field experiments with fodders. Cowra experiment farm. Agric. Gaz. New South Wales 32: 237-238. 1921.—Cereals for hay yielded from 6 to nearly 9 tons of green fodder per acre. Rape yielded nearly 6 tons and swede turnips 2.5 tons per acre.—*L. R. Waldron.*

619. MACH, F., P. LEDERLE, U. S. W. Prüfung verschiedener Verfahren zum Rauchbar-machen kleiner Tabakmengen. [Tests of various methods for curing and preparing small quantities of tobacco.] Mitteil. Deutsch. Landw. Ges. 36: 215-217. 1921.—The author describes 3 methods for the home curing of small quantities of tobacco. Tables are given showing the percentages of various substances in the tobaccos cured by each method.—*A. J. Pieters.*

620. McKERRAL, A. Report of the Hmawbi Agricultural Station; Report on the Tatkôn Agricultural Station. Ann. Rept. Agric. Sta., Agric. Chem., Agric. Eng., Asst. Bot. Northern Circle, and Asst. Entomol. Burma 1918-1919: 69-89. 1920.—The report records progress in experiments with fertilizers; methods of cultivation; and selection, trial, and distribution of seeds of crop plants.—*Winfield Dudgeon.*

621. MATENAERS, F. F. Die Silage aus dem Gemenge von Hafer, Erbsen und Wicken. [Silage out of a mixture of oats, peas, and vetch.] Mitteil. Deutsch. Landw. Ges. 36: 249. 1921.—Much of the paper is a plea for the greater use of the silo in Germany. A brief account of the successful use of a mixture of oats, pea, and vetch silage in Iosco County, Michigan, is presented.—*A. J. Pieters.*

622. MUNDY, H. G., J. A. T. WALTERS, AND G. MAINWARING. Annual report of experiments, Experiment Station, Salisbury, 1919-20. Rhodesia Agric. Jour. 18: 33-42. Fig. 1-3. 1921.—The authors report results of rotation experiments with maize, giving general cultural practices and systems of fertilizing, arriving at the following conclusions: (1) The marked advantage of a change of crop; (2) the increased yield after a straw crop, the stubble of which is ploughed under thereby supplying organic matter to the soil; (3) the still greater yield when the previous crop has been a legume; (4) the outstanding merit of velvet beans as a previous crop; (5) the advantage of early planting in a normal season on the high veld.—Liming trials on ground nuts, maize, beans, summer wheat, and boer manna are reported. No marked

general increase in yield of grain or hay can be attributed to the use of lime in the case of any of these crops.—Variety tests for ground nuts are reported as well as experiments with 19 varieties of dwarf beans and 20 of runner beans. Seed yields of important legumes such as velvet beans, Canadian beans, tepary beans, soybeans, field pea, and chick pea are given. Flax grown for fiber and for seed is discussed. Results with root crops are presented.—*Mary R. Burr.*

623. OLIVARES, DANIEL. El cultivo de la alfalfa y su henificación. [Alfalfa cultivation and the making of hay.] *Rev. Agric. [Mexico]* 5: 427-430. 6 fig. 1920.—Popular.—*John A. Stevenson.*

624. OLSEN, EDGAR I. Fifteenth annual report of the state demonstration farms, 1920. *North Dakota Agric. Exp. Sta. Bull.* 148. 38 p., 8 fig. 1921.—Detailed yields are given and methods of operation for the 19 demonstration farms operating in North Dakota. Figures are given for cost of production and also milling and baking data for 29 samples of wheat, grown on the different farms. The report deals with the following crops: Wheat (common and durum), oats, barley, flax, corn, potatoes, alfalfa for hay and seed, timothy, and sweet clover. For 1920 the demonstration farms showed a net profit of \$3.13 per acre.—*L. R. Waldron.*

625. OPAZO, ROBERTO. Cultivo de plantas oleaginosas. [Cultivation of oil plants.] *El Agricultor [Chile]* 5: 195-198. 5 fig. 1920.—Brief cultural directions are given for the peanut, sunflower, poppy, sesamum, and soybean. The olive is not recommended because of its slow growth.—*John A. Stevenson.*

626. OVERGAARD, J. C. Undersogelser over Landbrugets Driftsforhold. [Survey of the business of agriculture.] *Tidsskr. Landokonomi* 1921: 78-87. 1921.—A description is given of economic conditions in Danish agriculture during 1918-19. Tables are included showing the number and size of farms under cultivation, and presenting statistics for livestock on farms, butter production, etc.—*Albert A. Hansen.*

627. PRIDHAM, J. T. The elimination of the unfit. *Agric. Gaz. New South Wales* 32: 235-236. 1921.—The article advocates for use varieties improved by pure line breeding.—*L. R. Waldron.*

628. PRIDHAM, J. T. Varieties of oats tested in New South Wales. *Agric. Gaz. New South Wales* 32: 249-252. 1921.—Notes are given on 72 varieties, including synonyms, in regard to season, character of leaves and straw, appearance of grain, breeding or origin, defects, good points, and districts to which they are suited.—*L. R. Waldron.*

629. RAMÍREZ, ROMÁN. Anonacea textil. [An anonaceous textile plant.] *Rev. Agric. [Mexico]* 4: 505. 1 fig. 1919.—A brief description is given of *Rollinia* sp. and the fiber obtained from it.—*John A. Stevenson.*

630. ROOT, A. I. The new sweet clover, grown by the acre. *Gleanings in Bee Culture* 49: 46-47. Fig. 1-2. 1921.—The new annual sweet clover is a mutant of white sweet clover (*Melilotus alba*). Brief reports are given on the cultivation of annual sweet clover in Ohio, Vermont, Illinois, and Iowa.—*J. H. Lovell.*

631. SAEZ, DANIEL. El cultivo del algodón en Artigas. [Cotton cultivation in Artigas.] *Defensa Agric. [Uruguay]* 1: 281-283. 1920; 2: 24-25. 1921.—A popular account of cotton cultivation is presented.—*John A. Stevenson.*

632. SAILLARD, ÉMILE. Ensayos culturales sobre diversas variedades de remolacha azucarera durante el año 1920. [Cultural experiments with sugar beet varieties in 1920.] *Informacion Agric. [Madrid]* 11: 132-135. 1921.—Experiments were undertaken in 1920 by the syndicate of sugar manufacturers of France with sugar beet varieties. Five foreign and 5

native varieties were tested in 7 localities; the native varieties proved slightly superior. A brief account is given of trials made in England with some of the same varieties. The results of the analyses of 3088 sugar beet roots of the variety Vilmorin B are given. Those containing 19.5 to 20.5 per cent of sugar represented 65 per cent of the total number. In weight, 77 per cent contained between 600 and 1000 gm. of sugar, and included most of the roots with a sugar content of over 20.5 per cent.—*John A. Stevenson.*

633. SARRASIN, J. MAIMÓ. Una planta dafina. La Melica macra o pasto serrucho. [A noxious weed. *Melica macra* or saw grass.] Defensa Agric. [Uruguay] 2: 5-9. 4 fig. 1921.—This grass has become a bad weed in the uplands of Uruguay where it is spreading rapidly. It is not eaten by stock nor injured by fire. The spines are injurious to sheep.—*John A. Stevenson.*

634. SCHERFFIUS, W. H. Factors that affect the growth, reproduction, and maturity of tobacco. Jour. Dept. Agric. Union of South Africa 1: 728-731. 1920.—The author briefly discusses the factors light, including intensity, quality and duration; temperature and moisture; chemical changes; fertility of soil; and their effects on growing tobacco plants.—*Lyman Carrier.*

635. SEARS, R. N. A new clover. Amer. Bee Jour. 61: 141. 1921.—At Alturas, Modoc County, in the northern part of California, cow clover (*Trifolium involucreatum*) is common in the meadows and along streams. According to F. C. PELLETT, cow clover resembles alsike clover and has every characteristic of a valuable forage plant. The honey from this new clover is paler than that from alfalfa.—*J. H. Lovell.*

636. SHEPHERD, A. N. Farmers' experiment plots. Hay trials, 1920. Murrumbidgee irrigation areas. Agric. Gaz. New South Wales 32: 239-241. 1921.—Trials were conducted on 4 farms. The results from wheats and oats were nearly the same. Zealand wheat was excellent for hay production under irrigation and Yandilla King gave good returns.—*L. R. Waldron.*

637. SPARKS, G. C. Farmers' experiment plots. Wheat, oat and barley experiments, 1920. Southern district. Agric. Gaz. New South Wales 32: 229-234. 1921.—These experiments were conducted upon 12 farms; seasonal and soil notes are given. Canberra, Federation, and Yandilla King yielded best. The new variety, Gresley 83, did well at the 1 place where tried. Standard manuring with 56 lbs. of superphosphate per acre gave best results. Early seeding gave best results at 1 farm. Graded seed gave the best average results. Heavy seeding gave the best results generally. One trial showed better yield for unacclimatized seed. Oat and barley trials showed no positive results.—*L. R. Waldron.*

638. THOMPSTONE, E. Report of the Mandalay Agricultural Station; Report on the Botanical Area, Mandalay; Report on the Bugyi and Nagu Plots; Report of the Padu Agricultural Station; Report of the Hopin Agricultural Station; Report of the Yawnghwe Agricultural Station; Report of the Hsumhsai Experimental Station. Ann. Rept. Agric. Sta., Agric. Chem., Agric. Eng., Asst. Bot., Northern Circle, and Asst. Entomol., Burma 1918-1919: 1-68. 1920.—At the various stations and plots, work is carried on in investigation of fertilizers and fertilizer methods; methods of cultivation; selection, trial, and distribution to cultivators of promising varieties of field crops. Attention has been given to 2 special problems: The parasitism, and methods of eradication, of *Striga lutea*; and the value and methods of utilization of *Eichornia crassipes* as fertilizer material.—*Winfield Dudgeon.*

639. TROWBRIDGE, P. F. Report of the director, North Dakota Agricultural College Experiment Station, for the fiscal year ending June 30, 1920. North Dakota Agric. Exp. Sta. Bull. 146. 48 p., 6 fig. 1921.—The work reported upon includes comparative yield tests with wheat in a rotation series. Rotation plots in 1919, when rust was exceedingly prevalent, gave better yields than the plots continuously cropped. Baking and milling tests of varieties of wheat

are discussed, likewise forage-crop investigations, including nurse crop experiments with sweet clover, and a botanical study of the vegetative habits of *Bromus inermis*. Notes are given on diseases of wheat and potatoes, disease control, barberry eradication, and resistant strains of flax.—*L. R. Waldron*.

640. VARGAS, LEANDRO M. Cultivo del ramie. [Cultivation of ramie.] *Rev. Agric. [Mexico]* 5: 507-518. 8 fig. 1920.—A general account is given of the culture of ramie (*Boehmeria nivea* and related species), including geographical distribution, climatic and soil requirements, and botanical description. The method of preparing the fiber is described.—*John A. Stevenson*.

641. VARGAS, LEANDRO M. Cultivo de la Sansevieria. [Sansevieria cultivation.] *Rev. Agric. [Mexico]* 5: 583-585. 2 fig. 1920.—The growing of sansevieria (*Sansevieria* spp.) is recommended for Mexico. A popular account of the plant and approved methods of cultivation are given.—*John A. Stevenson*.

642. WALTERS, J. A. T. New crops for Rhodesia. Report on some of the experiments conducted at the Agricultural Experiment Station, Salisbury, and the Gwebi Farm, 1919-1920. *Rhodesia Agric. Jour.* 17: 432-435. Pl. 1-5. 1920.—Among the hay crops tested on the experiment station at Salisbury and the experiment farm at Gwebi, Teff (*Eragrostis abyssinica*) made the largest yield, 4,441 lbs. per acre. Kudzu, velvet beans, Boer manna (*Setaria italica*), summer oats, and Sudan grass yielded in the order named. Mixtures of 2 or 3 crops made higher yields than any of the crops alone. The Niger oil plant (*Guizotia oleifera*), Sunn hemp (*Crotalaria juncea*), Gotani bean (*Canavalia gladiata*) [error, = *C. ensiformis*], Kafir beans (*Vigna sinensis*), black velvet beans (*Stizolobium utile*) [error, = *S. aterrimum*], Florida velvet bean (*Stizolobium deeringianum*), and ground nuts (*Arachis hypogaea*) were tested as green manures and yielded in the order named from 29,040 to 7,920 lbs. per acre. Among the cereals, Kherson oats and buckwheat were promising, the latter principally on account of its freedom from disease. Eighteen varieties of Kafir corn, 34 of Dhal (*Cajanus indicus*), and several of field peas were also tested.—*H. N. Vinall*.

643. WARTH, F. J. Annual Report of the Agricultural Chemist to Government, Burma. *Ann. Rept. Agric. Sta., Agric. Chem., Agric. Eng., Asst. Bot. Northern Circle, and Asst. Entomol. Burma 1918-1919*: 90. 1920.—Progress is recorded in investigations on rice soils; and on Burma beans (*Phaseolus lunatus* L.).—*Winfield Dudgeon*.

644. WERTH, E. Übersicht über die Kartoffelsorten, die sich bei den bisher in Deutschland angestellten Versuchen zur Prüfung der Widerstandsfähigkeit gegen Kartoffelkrebs bewährt haben. [Review of the potato varieties which have, in the experiments so far carried on in Germany, retained their immunity to potato wart.] *Mitteil. Deutsch. Landw. Ges.* 36: 262. 1921.—The author lists a total of 52 varieties of potatoes and gives in tabular form information as to skin, flesh, form, total number of experiments, and degree of infection.—*A. J. Pieters*.

645. WIERUP. Anbauversuche mit Bohnen. [Culture experiments with beans.] *Mitteil. Deutsch. Landw. Ges.* 36: 245-249. 1921.—Reports are given from 6 different stations on tests of a number of varieties of field beans.—*A. J. Pieters*.

646. YOUNG, THOMAS. Flax growing in Scotland. *Trans. Highland and Agric. Soc. Scotland* 22: 79-100. 1920.—The history of flax growing in Scotland and its reestablishment during the war are discussed.—*H. V. Harlan*.

647. ZURCHER, F. A. Non-setting of Uba seed. *South African Sugar Jour.* 5: 245. 1921.—The Uba sugar-cane arrows freely in Portuguese East Africa (the Zambesia and Quilimane districts) but the flowers are sterile. For 4 years experiments have been made in which every means and care were taken to obtain fertilization, but no seed has set.—*C. Rumbold*.

BIBLIOGRAPHY, BIOGRAPHY AND HISTORY

NEIL E. STEVENS, *Editor*

(See also in this issue Entries 606, 646, 680, 703, 799, 1073, 1076, 1078, 1080)

648. ANONYMOUS. Augustin de Candolle. Roy. Bot. Gard. Kew. Bull. Misc. Inform. 1920: 219-220. 1920.—Richard Emile Augustin de Candolle (1868-1920), younger son of Casimir de Candolle, was born and received part of his education in England. Though trained for the law, he devoted himself largely to scientific pursuits and had a wide range of scientific interests. For the period 1912-1918, he served as British consul for the Canton of Geneva, relinquishing this post on the death of his father, to take up the custodianship of the famous Candollean library and herbarium and to resume his interrupted scientific occupations.—*M. F. Warner.*

649. ANONYMOUS. Biography and portrait of Dr. F. Kolpin Ravn made available. Phytopathology 11: 101-102. 1921.

650. BACCARINI, PASQUALE. [Piero Bargagli, 1844-1918.] Bull. Soc. Bot. Ital. 1918: 68. 1918 [1919].—Bargagli was one of the founders of the Italian Botanical Society and author of a number of botanical papers.—*M. F. Warner.*

651. BRITTEN, JAMES. London Pride. Garden 84: 528. 1920.—The author discusses the question whether this name for *Saxifraga umbrosa* is derived from the city, or, as has been asserted, from George London (died 1713), who founded the Brompton Park Nursery in 1681, and was gardener to Henry Compton, Bishop of London, to William and Mary, and to Queen Anne. The name "London Pride" was given to Sweet William as far back as 1633, being found in Johnson's edition of Gerard, and while it was applied to *Saxifraga umbrosa* by Molyneux (Phil. Trans. 19: 570) in 1697, it seems unlikely that it originated with George London, as it had so long been used for another familiar plant. Other plants to which the name has been applied are mentioned, as well as other names referring to the same plant.—*M. F. Warner.*

652. BUNYARD, E. A. John Tradescant, senior. Jour. Pomol. 1: 188-196. 1 fig (portrait). 1920.—Tradescant has been identified by Dr. J. HAMEL as author of the MS. in the Record Office, entitled "A Voiag of Ambussad undertaken by the Right Honourable Sir Dudlie Diggs in the year 1618," which took him to Archangel. In 1611 he visited the Low Countries in search of new plants and fruits for Lord Salisbury's gardens at Hatfield; in 1620-21 he joined Mansell's expedition against the Algerian pirates, and succeeded in bringing home plants and flowers; and in 1627 he accompanied the Duke of Buckingham on his ill-fated expedition to La Rochelle. The rare Musaeum Tradescantianum is the list of curiosities in "Tradescant's Ark" at Lambeth, published by the younger John Tradescant in 1656.—*M. F. Warner.*

653. BUTLER, E. J. The imperial (British) Bureau of Mycology. Phytopathology 11: 100. 1921.—The purpose of the Bureau, now established at Kew, and the scope of the work to be carried on are given.—*B. B. Higgins.*

654. C., H. Ancient mulberry trees and their history. Country Life [London] 43: 145. Illus. 1918.—Many specimens have been planted by famous personages. One still standing and bearing excellent fruit at Christ Church College, Cambridge, is reputed to have been planted by Milton, but is probably the last of 300 trees set out in 1608-09, the year of his birth. Those at Syon House are of especial interest, including one said to be the oldest in England, introduced from Persia in 1548. Another, planted at Buckingham Palace at the time of the edict of James I for the introduction of silk culture into England, is still bearing fruit. Although the mulberry was made fashionable by this edict about 1605, it is an interesting fact that the trees then planted were mostly of the black sort, the leaves of which are not valuable for silkworms.—*M. F. Warner.*

655. DANGEARD, P. A., H. LECOMTE, ET E. PERRIER. *Discours prononcés aux obsèques de M. Éd. Bureau, professeur honoraire du Muséum.* (18 décembre 1918.) [Funeral addresses for Édouard Bureau.] *Bull. Mus. Hist. Nat. Paris* 25: 2-11. 1919.—Three addresses on the life and career of Louis Édouard Bureau (1830-1918) are given. Dangeard, president of the Botanical Society of France, refers to him especially as one of the founders of the society; his work as a botanist, and particularly in the field of paleobotany, with his long active scientific service (1872-1906) at the Paris Museum of Natural History, are discussed by Lecomte of the Museum; while Perrier, as its director, speaks more particularly of Bureau's official connection with that institution.—*M. F. Warner.*

656. FAIRCHILD, DAVID. *An agricultural explorer in China.* *Asia* 21: 7-13. *Illus.* 1920 [1921].—A popular sketch of the unusual personality, romantic and dangerous experiences, and practical achievements of FRANK N. MEYER, who disappeared from a steamer on the Yangtze River, June 2, 1918. Some of his important introductions are briefly discussed: Fruits, ornamentals, a wild chestnut with strong resistance to the bark disease, and many others. His peculiar qualifications for, and devotion to, his work are emphasized. "His life was always that of a plantsman"—"extremely sensitive to the world around." His associates in the Office of Foreign Seed and Plant Introduction have established in his honor a medal to be awarded yearly for valuable work in plant introduction, the first recipient of which was Mr. Barbour Lathrop of San Francisco, the second Dr. L. Trabut, of Algiers.—*M. F. Warner.*

657. FAURÉ-FREMIET, E. *Le mouvement actuel pour la réorganisation des recherches scientifiques en France.* [The present movement for reorganization of scientific research in France.] *Bull. Soc. Philomathique Paris* X, 11: 1-79. 1920.—The author presents a history of the organization and activities of various French and inter-allied scientific conferences and federations during 1919 and 1920. The results obtained are summarized under the headings: Fauna of France; analytic bibliography; scientific publications; material aid to societies.—*C. E. Allen.*

658. GUYER, R. G. *Cultivation of medicinal plants in Scotland—past and present.* *Pharm. Jour.* 106: 146-149, 168-171, 190-192. *Fig. 1-6.* 1921.—As early as 1661 the gardener of George Heriot's Hospital in Edinburgh had been directed to plant all kinds of "phisical, medicinal, and other herbs," but in 1670 Sir Robert Sibbald (born 1641), who was afterwards first professor of Medicine at the University of Edinburgh and first president of the Royal College of Physicians, together with his friend Dr. Andrew Balfour, developed (1) a small "Medicine Garden" in the Abbey gardens, and in 1677 they founded (2) the Town Garden at Trinity Hospital, both of which were placed in charge of James Sutherland, who in 1683 published *Hortus Medicus Edinburgensis*; or a Catalogue of the Plants in the Physical Gardens at Edinburgh. In 1702 (3) the University Garden was established at "Kirk o'Fields," and all 3 gardens, though independent, were in control of Sutherland, who was also professor of Botany in the Town College. In recent years Thomas Fairgrieve (1819-1893) had a drug-plant garden at Ormiston, and John Duncan a large collection of medicinal plants under cultivation where St. Peter's Church now stands. The most modern drug-plant garden in Edinburgh is that of Duncan, Flockhart & Co. (1915), just across the way from the Royal Botanic Gardens. They are growing commercially aconite, belladonna, colchicum, foxglove, henbane, poppies, roses, stramonium, and valerian. Among the experimental crops are broom, calendula, conium, chamomile, dandelion, elder, fennel, juniper, licorice, timothy grass, veratrum, and male fern. The author gives many details in regard to Sibbald and Sutherland, and much attention to the modern methods of cultivation, soil and manurial requirements, manner of collection, drying and preservation, and commercial success of the various drug crops.—*E. N. Gathercoal.*

659. HERRINGTON, ARTHUR, AND J. W. ELLIOTT. *William Robinson, the man and his work.* *Garden Mag.* 31: 253-257. *Illus., including portrait.* 1920.—"The work that he has done," is by Herrington; and "His gardens at Gravetye Manor," by Elliott.—*M. F. Warner.*

660. HUFFEL, GUSTAVE. *Dénominations anciennes de nos forêts*. [Former terminology of our forests.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 267-273. 1920.—A list of terms applied to forests by the French in the feudal period is given with brief descriptions of their origin and use.—*S. T. Dana*.

661. JERMSTAD, A. *Ueber Carl von Linnés Beziehungen zur Pharmazie und zu den Apothekern*. [On Carl von Linne's connection with pharmacy and apothecaries.] Schweiz. Apoth. Zeitg. 58: 533-536. 1920.—The work of Linnaeus as inspector of pharmacies, and his continued interest in the advancement of the profession are discussed. In 1741 he published a list of the native medicinal plants of Sweden which ought to be familiar to the pharmacist, and the Pharmacopoea svecica I (1775) was largely due to his instigation. He recommended the cultivation in Sweden of foreign medicinal plants, not in the botanical gardens, but on a large scale in physic gardens. Ferber, a pharmacist of Karlskrona, had such a garden at Agerum, and published an index of about 400 plants grown there under the title: Hortus Agerumensis (1739), said to be the first work printed in Sweden in which the Linnaean sexual system was employed.—*M. F. Warner*.

662. LE LECTIER. *Catalogue des arbres cultivez dans la verger et plan du Sieur Le Lectier procureur du roy à Orléans*. M.DC. XXVIII. [The catalogue of fruit trees of Le Lectier.] 15 × 12 cm., 35 + 1 p. Privately printed [for E. A. Bunyard: Maidstone, England, 1920].—The catalogue is printed from a transcript made by M. Gibault of the French national horticultural society, from the original in the Bibliothèque Nationale, Paris, which is supposed to be unique. It also appeared in Jour. Pomology 1: 242-252, 1920, under English title as above. A long list of varieties grown by an amateur in the early 17th century, comprising pears classed according to season, apples, plums, cherries, peaches, figs, and other fruits.—*L. H. MacDaniels*.

663. LISTER, GULIELMA. Sir Edward Fry. Proc. Linn. Soc. London 131: 53-54. 1919.—Eminent as lawyer, judge, and arbitrator, he was strongly interested in botany from his boyhood days, and published British Mosses (1892 and 1908), and with his daughter, Agnes, The Mycetozoa (1899), and The Liverworts (1911). He was born Nov. 4, 1827, and died Oct. 18, 1918.—*M. F. Warner*.

664. MITCHELL, DONALD. *Note on medicinal plant cultivation at Inverness: an old Highland pharmacist's experiences*. Pharm. Jour. 106: 232-233. 1921.—About the beginning of the 19th century there were at least 3 physic gardens in the immediate vicinity of Inverness. In 1808 peppermint was extensively cultivated. The oil of peppermint was obtained by distillation and sold in the wholesale market. The collection of bearberry leaves (*Arctostaphylos Uva-ursi*) was also a considerable industry near Inverness at this time, and dandelion root was collected and an extract prepared from it.—*E. N. Gathercoal*.

665. OBERLY, E. R. *List of literature on phytopathology*. Phytopathology 11: 101. 1921.—In view of the discontinuance of this list, the bi-weekly list of current literature prepared in the Bureau of Plant Industry Library is offered to members of the Phytopathological Society.—*B. B. Higgins*.

666. PAYNE, C. H. *A strawberry bibliography*. Jour. Pomology 1: 235-242. 1920.—A list is presented of nearly 100 titles, arranged as American, English, French, and German works, exclusive of articles in periodicals.—*L. H. MacDaniels*.

667. PRUESSNER, A. H. *Date culture in ancient Babylonia*. Amer. Jour. Semitic Lang. and Lit. 36: 213-232. 1920.—The author presents documentary material from the Code of Hammurabi, contract literature, and the Babylonian Talmud, showing requirements imposed upon the tenant or cultivator, data on methods of planting, care of trees, process of pollination, returns from and value of date orchards in the Hammurabi period.—*M. F. Warner*.

668. SEWARD, A. C. Prof. A. G. Nathorst. *Nature* 107: 112-113. 1921.—Alfred Gabriel Nathorst, who died at Stockholm, Jan. 20, 1921, at the age of 70, was director of the Paleobotanical Museum of the Swedish Academy for the greater part of his life. He discovered many new generic types of special interest from the point of view of evolution (*Pseudobornia*, *Lycostrobus*, *Cephalotheca*, *Wielandiella*, *Cycadocephalus*, *Camptopteris*); carried out explorations in Spitzbergen and other arctic countries, and published numerous papers on the Rhaetic floras of Scania. "It is to Nathorst more than any other man that we owe our knowledge of Arctic floras extending from the Devonian to the late Tertiary period." A lovable personality and delightful companion.—O. A. Stevens.

669. TUCKER, E. M. Bibliographical notes. *Jour. Arnold Arboretum* 2: 181-184. 1921.—The dates of publication of the volumes of *Nouveau Duhamel* and of the parts of *Torrey & Gray, Flora of North America*, and other bibliographical notes on these 2 works are given.—Alfred Rehder.

670. WHETZEL, H. H. The Phytopathological Society of France. *Phytopathology* 11: 100-101. 1921.

671. WILSON, E. H. The romance of our trees. *xvi + 278 p., 45 pl., incl. front.* Doubleday, Page & Co.: Garden City, New York, 1920.—A series of popular essays on interesting trees; their varieties, history, literary and legendary associations; with special chapters on the ginkgo, cedar of Lebanon, yew, horsechestnut, magnolias, beech, nut and fruit trees, Lombardy poplar, and Babylon willow, part of which were also published in the *Garden Magazine*, 1919-20 [see *Bot. Absts.* 6, Entries 1471, 1472, 1473, 1876, 1877].—M. F. Warner.

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ALFRED GUNDERSEN, *Assistant Editor*

(See also in this issue Entries 818, 864, 998)

672. ANONYMOUS. [Rev. of: BEVIS, J. F., and H. J. JEFFREY. *British plants: their biology and ecology. 2nd ed., xii + 345 p., 115 fig.* Methuen & Co.: London, 1920.] *Sci. Prog.* [London] 15: 670-671. 1921. [See also *Bot. Absts.* 9, Entry 676.]

673. ANONYMOUS. [Rev. of: DENSMORE, H. D. *General botany for universities and colleges. xii + 459 p., 289 illus.* Ginn & Co.: London and New York, 1920.] *Sci. Prog.* [London] 15: 668-669. 1921.—"The matter is written in an interesting style . . . the illustrations, too, are good, and the diagrams especially exhibit a quite unusual standard of conception." [See also *Bot. Absts.* 9, Entry 679].—J. L. Weimer.

674. ANONYMOUS. [Rev. of: FRITCH, F. E., and E. J. SALISBURY. *An introduction to the structure and reproduction of plants. viii + 458 p., 230 fig. & illus.* G. Bell & Sons: London, 1920.] *Sci. Prog.* [London] 15: 671-672. 1921.

675. ANONYMOUS. [Rev. of: JONES, W. N., and M. C. RAYNER. *A text book of plant biology. viii + 262 p., 6 pl., 36 fig.* Methuen & Co.: London, 1920.] *Sci. Prog.* [London] 15: 672. 1921.

676. B., W. E. [Rev. of: BEVIS, J. F., and H. J. JEFFREY. *British plants: their biology and ecology. 2nd ed., xii + 346 p., 115 fig.* Methuen and Co.: London, 1920.] *Nature* 107: 71. 1921. [See also *Bot. Absts.* 9, Entry 672.]

677. BAKER, RICHARD T. Scientific names for commercial timbers. *Nature* 107: 45. 1921.—Instances are cited where the scientific names have been put into general use in Australia.—O. A. Stevens.

678. BRUNNHOFER, A. VON. *Verwaltungsrecht und Holzhandel—zwei Vorlesungen die an der Schweizer. Techn. Hochschule gehalten werden sollten.* [Administration and timber sales—two subjects that should be taught in the colleges of Switzerland.] Schweiz. Zeitschr. Forstw. 72: 142–146. 1921.—The timber sale policy should be placed on a uniform basis, especially stumpage prices. At present, each community sells to its own advantage at the expense of the general market. Strong courses in these subjects would create a uniform method and bring about application. Courses should be strengthened in practical road building, special chemistry, soil studies, bacteriology, geology, field excursions, and practical forestry.—*J. V. Hofmann.*

679. D., M. *New American text books of botany.* [Rev. of: DENSMORE, HIRAM D. *General botany for universities and colleges.* xii + 459 p.; Laboratory and field exercises for general botany. viii + 199 p. Ginn and Co.: Boston and London, 1920.] Nature 107: 69–70. 1921.—The reviewer finds the text lacking in continuity and balance. "Figure 146, which purports to be *Amanita muscaria*, is clearly a *Coprinus*." The section on seasonal life of certain common plants is a good feature. [See also Bot. Absts. 9, Entry 673.]—*O. A. Stevens.*

680. GAGER, C. STUART. *Tenth annual report of the Brooklyn Botanic Garden, 1920.* Brooklyn Bot. Gard. Rec. 10: 23–81. 1921.—The report contains a résumé of the 1st decade of the Botanic Garden, as well as data for 1920. Reports of heads of departments, and a financial statement are included; also a bibliography of publications of members of the staff, and, as Appendix 6, the Agreement between the Ecological Society of America and the Brooklyn Botanic Garden concerning the publication of the journal, Ecology.—*C. S. Gager.*

681. K., F. *Plant biology.* [Rev. of: JONES, W. NEILSON, AND M. C. RAYNER. *A text book of plant biology.* viii + 262 p., 6 pl. Methuen and Co.: London, 1920.] Nature 107: 37–38. 1921. [See also Bot. Absts. 9, Entry 675.]

682. NEWMAN, L. F., AND H. A. D. NEVILLE. *A course of practical chemistry for agricultural students.* Vol. I. 235 p. University Press: Cambridge, 1920.—Laboratory exercises are given with blank pages for notes interleaved. Vol. I is intended to cover the 1st year's course on the chemistry and physics of the soil; it comprises 43 chapters and an appendix of tables of constants and analyses. Volumes II and III are announced to follow.—*C. S. Gager.*

CYTOLOGY

GILBERT M. SMITH, *Editor*

GEORGE S. BRYAN, *Assistant Editor*

(See also in this issue Entries 731, 1033)

683. ARLOING, F., ET G. RICHARD. *Sur la coloration vitale des corpuscules métachromatiques du Bacille diphtérique.* [Intravital staining of the metachromatic corpuscles of the *Bacillus of diphtheria*.] Compt. Rend. Soc. Biol. Paris 83: 267–269. 1920.—The granules of *Corynebacterium diphtheriae* react as metachromatic bodies when sufficient Nile Blue to give a barely perceptible tint is added to a hanging drop culture. The bodies of the bacterial cell are stained light blue and the granules rose colored or mauve or violet in 5–15 minutes. The bacteria remain alive in this dilute stain for many hours and appear normal.—*E. A. Bessey.*

684. ARMAND, L. *Les phénomènes nucléaires de la cinèse hétérotypique chez le Lobelia urens et chez quelques Campanulacées.* [The nuclear phenomena in the heterotypic mitosis of *Lobelia urens* and in other Campanulaceae.] Compt. Rend. Acad. Sci. Paris 172: 762–764. 1921.—A study of the stages in synapsis and the heterotypic division of the nuclei of the Campanulaceae is reported. Parasynapsis is not found to occur. A simple longitudinal spireme

is found which breaks up into n in place of $2n$ number of elements. The 2nd synaptic contraction takes place in the typical fashion.—*C. H. Farr.*

685. CUTLER, D. W. The cytological problems arising from the study of artificial parthenogenesis. *Sci. Prog.* [London] 15: 435-444. 1921.

686. DANGEARD, P. A. Vacuome, plastidome et sphérome dans l'*Asparagus verticillatus*. [The vacuomes, plastidomes, and spheromes of *Asparagus verticillatus*.] *Compt. Rend. Acad. Sci. Paris* 171: 69-74. *Fig. 1-16.* 1920.—The vacuome is shown to be a permanent portion of the cell, sometimes appearing as metachromatin and sometimes as vacuoles. Anthocyan is formed in the vacuoles and not in the plastids. Likewise, the plastidome may be in the form either of mitoplasts or plastids. The spherome is composed of microsomes.—*C. H. Farr.*

687. EMBERGER, L. Étude cytologique des organes sexuels des Fougères. [A cytological study of the sex organs of ferns.] *Compt. Rend. Acad. Sci. Paris* 171: 735-737. 1920.—The paper reports on a mitochondrial study of the prothallia of ferns. During the formation of the sperm mother-cells the chloroplasts become transformed into chondriocents. In the sperm itself the mitochondria are all granular. A similar transformation occurs in the egg. The fertilized egg has the same chondriosomal appearance as the apical cell of the stem.—*C. H. Farr.*

688. GUILLIERMOND, A. A propos de la constitution morphologique du cytoplasme. [Concerning the morphological constitution of the cytoplasm.] *Compt. Rend. Acad. Sci. Paris* 172: 121-124. *Fig. 1-8.* 1921.—A résumé is presented of the study of mitochondria in animals, fungi, and green plants. The author reiterates his former contention that there are 2 kinds of mitochondria in green plants, one of which is concerned with photosynthesis. In addition to these there are in the cytoplasm the fatty granules and the vacuoles.—*C. H. and W. K. Farr.*

689. GUILLIERMOND, A. Observation vitale des chondriome des champignons. [Observations of the chondriome in living fungi.] *Compt. Rend. Soc. Biol. Paris* 83: 404-408. *Fig. 1-11.* 1920.—In young growing unstained mycelia of *Endomyces Magnusi* careful observation shows nuclei, minute fat drops, vacuoles, and elongated thread-like chondriomes. Staining *intra vitam* with Dahlia Violet in very dilute solution shows that these chondriomes have a granular structure. In the older filaments the small vacuoles enlarge and fuse into larger vacuoles without modification of the chondriomes, which have no connection with them. Fixation with Fleming's solution, with acetic acid omitted, and staining with Fuchsin shows that the chondriomes are unchanged.—*E. A. Bessey.*

690. GUILLIERMOND, A. Sur la coexistence dans la cellule végétale de deux variétés distinctes de mitochondries. [The existence of two sorts of mitochondria in plant cells.] *Compt. Rend. Soc. Biol. Paris* 83: 408-411. *Fig. 1.* 1920.—In the meristem of root tips of peas chondriomes are present as filaments, short rods, or granules, that are all alike in staining and other characters. In the plerome and periblem there are bodies that stain less heavily, and which remain of chondriome nature, and bodies that stain heavily and elaborate starch grains. In the sporangia and other parts of the fern the chloroplasts also are similar to these heavily staining chondriomes and many lose their chlorophyll and become smaller and reduced to typical chondriomes. The author considers that plastids are usually (but not always) enlarged forms of these more heavily staining chondriomes.—*E. A. Bessey.*

691. GUILLIERMOND, A. Sur la métachromatine des champignons. [The metachromatin of fungi.] *Compt. Rend. Soc. Biol. Paris* 83: 259-263. 1 pl. 1920.—In the vacuoles of various fungi, *intra vitam* staining reveals small granules of metachromatin, which may increase in size under the influence of certain stains (e.g., neutral red). Sometimes these appear without staining as more refringent bodies in the vacuole. Evidently the metachromatin is mostly in solution but is precipitated out by the action of certain stains, changes in acidity, etc.—*E. A. Bessey.*

692. GUILLIERMOND, A. Sur l'origine des vacuoles dans les cellules de quelques racines. [The origin of the vacuole in the cells of some roots.] Compt. Rend. Soc. Biol. Paris 83: 411-414. Fig. 1-10. 1920.—In living rootlets of barley observed in an isotonic sugar solution the cells near the tip contain very numerous, elongated refractive filaments resembling chondriocents that can be colored by *intra vitam* staining with Neutral Red or Nile Blue. In older cells they contract and enlarge and eventually anastomose or fuse to become true vacuoles, the staining becoming fainter as if the stainable substance were becoming diluted. Fixation and staining shows the chondriomes in the cells even where the vacuoles are already well developed. In certain plants, such as gourd, root tips fixed and stained by REGAUD's method show true chondriocents and mitochondria in addition to these vacuole-producing bodies. The author doubts whether the latter really ought to be considered as of chondriosomal nature. These, not the true chondriosomes, are the structures DANGEARD has studied by *intra-vitam* staining methods.—E. A. Bessey.

693. HERRERA, A. L. Artificial cells. Sci. Amer. Monthly 3: 221-222. Fig. 1-3. 1921. [Translated from La Nature (Paris), July 31, 1920.]—An account is given of some experiments seeking to imitate natural cells. Artificial cells thus produced exhibited all the morphological characteristics of cell wall, cytoplasm, nucleus, and even mitotic division.—Chas. H. Otis.

694. JANSSENS, F. A. Observations sur les mouvements des flagelles de la *Polytoma uvella* (Ehrenb.). [Observations on the movements of the flagella of *Polytoma uvella*.] Compt. Rend. Soc. Biol. Paris 83: 296-299. Fig. 1-14. 1920.—The 2 flagella pointing straight forward make a sudden sweep of nearly 180°, making thus a sharp curve at the point of attachment. This curve progresses up the flagellum so that the recurved portion becomes shorter and shorter and the forward pointing portion longer until the original position is reached.—E. A. Bessey.

695. KIHARA, HITOSHI. Über cytologische Studien bei einige Getreide-Arten, Mitteilung III. Über die Schwankungen der Chromosomenzahl bei den Speciesbastarden *Triticum*-Arten. [Cytological studies on some wheat species. III. Concerning the fluctuation of the chromosome number in *Triticum* species hybrids.] Bot. Mag. Tôkyô 35: 19-44. Pl. 1. 1921.—The author described chromosome behavior in F_2 , F_3 , and F_4 of crosses between *T. polonicum* ($x = 14$) female and *T. spelta* ($x = 21$) male. He assumes that the F_1 hybrid ($2x = 35$), owing to the specificity of individual chromosomes, would form functional gametes only when the gamete contains either a complete set of 21 *spelta* or 14 *polonicum* + i (isolated or unpaired) *spelta* chromosomes. Fertilization of 14 + i gametes with one another gives *polonicum*-like plants, in whose meioses the i (isolated or unpaired) chromosomes tend to lag behind and be left out of the homeotypic nuclei. Succeeding generations tend to return to the *polonicum* type with 28 chromosomes. Gametes with 21 *spelta* chromosomes may fuse with one another or with 14 *polonicum* + i *spelta* and give rise to *spelta*-like plants. A thorough study of the descendants of one F_2 hybrid with 38 chromosomes (17 bivalents + 4 isolated) showed plants with 38, 39, 40, and 41 chromosomes only. A plant in another series showed 42. This 38-chromosome plant formed gametes with 17, 18, 19, 20, and 21 chromosomes. As shown above, however, only such combinations were viable as arose when one gamete had a full complement of 21 *spelta* chromosomes. Examination of the meiotic figures of these descendants showed invariably 17 pairs + 4 i (38), 18 pairs + 3 i (39), 19 pairs + 2 i (40), 20 pairs + 1 i (41), or 22 pairs. No plants were found with 34, 35, 36, 37 or any chromosome combinations other than those specified above. The paper is accompanied by unusual photomicrographs of meiotic figures and contains a discussion of the probable application of the author's conclusions to the facts uncovered in *Oenothera* by GATES, STOMPS, LUTZ, GEERTS, and others.—Leonas L. Burlingame.

696. KYLIN, HARALD. Bemerkungen über den Bau der Spermatozoiden der Fucaceen. [Observations concerning the structure of the sperms of Fucaceae.] Ber. Deutsch. Bot. Ges. 38: 74-78. Fig. 1-2. 1920.—RETZIUS and MEYES' observations on the structure of *Fucus*

sperms are briefly stated. MEYES was not in agreement with the findings of Kylin (1916) on the same subject, a fact which led Kylin to review his work. He investigated the sperms of *Fucus Areschougii* killed with ALTMAN's mixture, stained with rosanilin, and preserved in potassium acetate solution. This revealed a red colored "plastomere" at the rear of the chromatophore; and in front of it a light red-colored granule, the "blepharoplast," from which spring the 2 cilia. Staining with haemalum shows the blue-staining nucleus, lying opposite the "blepharoplast." The author states that the chromatophore first develops as a leucoplast.—*N. L. Gardner.*

697. LITARDIÈRE, R. DE. Le dimorphisme des éléments chromosomiques chez le *Polypodium Schneideri* pendant les périodes de télophase et d'interphase. [The dimorphism of the chromosomes of *Polypodium Schneideri* during the periods of telophase and interkinesis.] *Compt. Rend. Acad. Sci. Paris* 172: 607-608. 1921.—*Polypodium Schneideri* is a hybrid between *P. aures* and *P. vulgare* var. *cornubiense*. Two sets of chromosomes appear in the telophase and persist during interkinesis, but during the prophase the heteromorphic nature of the chromosomes disappears and in the metaphase very little difference can be seen between them.—*C. H. Farr.*

698. MANGENOT, G. Sur le chondriome et les plastes dans l'antheridie des Fucacées. [The chondriome and plastids in the antherids of Fucaceae.] *Compt. Rend. Soc. Biol. Paris* 83: 275-276. *Fig. 1-5.* 1920.—The plastids in the cells destined to become the antherids divide by simple fission until they are numerous. At the same time the nuclei are dividing. The plastids become paler, more elongated, and finally reach the state of true, almost colorless chondriocents that later become red-orange in color and fusiform in shape and lie appressed, 1 to each nucleus, forming the red point of the future antherozoid. The granular mitochondria remain unchanged during this plastid change, grouping themselves in groups of 5-8 in the vicinity of each nucleus.—*E. A. Bessey.*

699. MANGENOT, G., ET L. EMBERGER. Sur les mitochondriès dans les cellules animales et végétales. [Mitochondria in animal and plant cells.] *Compt. Rend. Soc. Biol. Paris* 83: 418-420. *Fig. 1-6.* 1920.—The cells of the liver and kidney of the frog and of the root of a fern (*Anthyrium*) fixed and stained by REGAUD's method show similar mitochondria,—rods, filaments, and granules. The authors believe these structures are homologous. They differ from the vacuole-producing bodies of similar appearance in that they do not stain intravitaly. The chondriome and vacuome systems are distinct.—*E. A. Bessey.*

700. MÖBIUS, M. Über die Grösse der Chloroplasten. [On the size of chloroplasts.] *Ber. Deutsch. Bot. Ges.* 38: 224-232. 1920.—The author presents in tabular form his measurements of the greatest diameter of the chloroplasts of 215 species, including a number of algae, liverworts, and mosses in addition to 206 vascular plants. Half of the plants in this list have chloroplasts 5 μ in diameter and 75 per cent of them have chloroplasts between 4 and 6 μ in diameter. There is little evidence of any relation between size and systematic position. The range within the Nymphaeaceae (*Victoria regia* 7-10 μ and *Nelumbium speciosum* 4-5 μ) is almost as great as the range (3-10 μ) in all plants examined. No relation exists between the size of cells, size of leaves, texture of leaves, or habitat of the plant and the size of the chloroplasts. Excluding succulent water plants the herbaceous plants generally have larger chloroplasts than woody ones, possibly because of the relatively smaller water content of the leaf cells of woody plants. The relatively constant size of the nucleus throughout the plant kingdom is that which is most favorable for the molecular adsorption force by which, according to WILLSTÄTTER, the chlorophyll pigment is held on the framework of the chlorophyll grain. This constancy of size of the chloroplast he contrasts with the wide range in size of mature parenchyma cells (.01-.09 mm.) and of nuclei (in monocotyledons 2.5-17 μ).—*R. M. Holman.*

701. SEIFRIZ, WILLIAM. Observations on some physical properties of protoplasm by aid of microdissection. *Ann. Bot.* 35: 269-296. 1 *fig.* 1921.—A discussion is presented of the

knowledge of cellular organization obtained by direct dissection of living material with CHAMBER'S modification of the BARBER apparatus. The material studied included plants from most of the great groups, as well as protozoa and other animals. Plasma membranes differing in physical and probably chemical structure are found on all protoplasmic surfaces and may be removed by direct dissection. The plasma membrane has a thickness of about $\frac{1}{10}$ μ . Vacuolar and nuclear membranes may also be removed in the same manner. These microdissections are possible because of the immiscibility of protoplasm, using the term in its broadest sense, with water—an immiscibility which is due to the colloidal nature of the living substance as contrasted with the miscibility of water with protoplasm when the latter is dead or near death. Since there is this immiscibility with water the absorption of water is considered an imbibition process.—*Gilbert M. Smith.*

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

J. H. HOFMANN, *Assistant Editor*

(See also in this issue Entries 660, 671, 677, 678, 878, 955, 969, 983, 1092)

702. ANONYMOUS. Brændespørgsmaalet og Dansk Skovforenings Stilling dertil. [The fuel situation and the position of the forestry association on this question.] Dansk Skovforenings Tidsskr. 5: 265-286. 1920.—Reports and recommendations of the Danish Forestry Association relative to utilization, prices, laws and regulations, administration, and standards of measurement are presented.—*J. A. Larsen.*

703. ANONYMOUS. Die Waldverhältnisse Griechenlands. [The forest conditions of Greece.] Wiener Allg. Forst- u. Jagd Zeitg. 38: 310-311, 317, 319. 1920.—In ancient Greece the forests covered a large area; at present only about $\frac{1}{10}$ of this area is forested, due to clearing of the land for agriculture, fire, and grazing. This devastation began when a fanatical Christianity destroyed first the sacred groves and later extended its work to the mountain forests, which were regarded as haunts of pagan gods.—Oak, the most prominent genus in ancient Greece, is still supreme, with 15 species recognized. *Quercus conferta* and *Q. robur* are most frequent, but others are also widely scattered. Beech (*Fagus silvatica*) is second in importance to the oaks, followed by chestnut (*Castanea vesca*). Other hardwoods play minor rôles, including 2 species of elm (*Ulmus campestris* and *U. effusa*), 3 species of poplar (*Populus alba*, *P. nigra*, and *P. tremula*), 6 of maple (*Acer campestre* being the most prominent, followed by *A. creticum*, *A. monspessulanum*, *A. platanoides*, *A. reginae amaliae*, and *A. ricinifolium*). Alder (*Alnus glutinosum*) is found sparingly, as are also 2 ashes (*Fraxinus ornus* and *F. excelsior*) and sycamore (*Platanus orientalis*). Seven species of willow are found (*Salix alba*, *S. caprea*, *S. cinerea*, *S. fragilis*, *S. incana*, *S. purpurea*, *S. triandra*). Among conifers the Apollo fir (*Abies apollinis* or *A. parnassica*) is most important, yielding timber and a healing balsam. Amalia fir (*Abies reginae amaliae* or *Arcadica*) is also found, together with *A. panachaica* and *A. cephalonica*. This last species has suffered much from destructive lumbering during the past century but still occupies an area of about 12,000 hectares in the Aenos mountains. *Pinus laricio*, which goes by several popular names, is widely scattered throughout the mountains of Greece, usually in mixture with fir; it is widely used in ship-building. *Pinus maritima* is found near the coasts and on many islands and is frequently tapped for its resin. A 3rd species of pine, *Pinus pinea*, is now rather rare. It is famous for the flavor of the nuts. *Juniperus oxycedrus* and *J. macrocarpa* are found scattered throughout the mountains of Attica, while *J. communis*, *J. drupacea*, *J. nana*, *J. phoenicea*, and *J. turbinata* are found only in the Peloponnesus and some of the islands. *J. foetidissima* is the only species forming pure stands. A general forest description of Mount Pentelicus is given. The organization of Greek forest administration is briefly outlined. The field organization fails to equal the "paper" organization and in general the work is not very well handled and Greece is to be classed as backward in forestry although progress is being made. As a result

of a recent Austrian mission to Greece under Dr. STENGEL a higher forestry school has been founded at Athens, and a corps of men has been built up for torrent control work. The new laws provide further for the encouragement of private forestry, revise the whole state organization along modern lines, and provide for forest fire protection. The Austrian mission has also initiated growth and volume studies on the firs of Greece.—*F. S. Baker.*

704. ANONYMOUS. Price list of forest-tree transplants, ornamental shrubs, hedge plants and seeds obtainable from the forest nursery, Salisbury. Rhodesia Agric. Jour. 17: 554-555. 1920.—Conditions under which shipments of young trees are made are stated. Forest tree transplants when ordered in quantities are grown and shipped in tins containing 4 to 25 plants in a tin. Prices of transplants and of seeds are given for a number of species.—*A. J. Pieters.*

705. ANONYMOUS. Terpentinöl, Harz und Fett aus einheimischen Nadelhölzern. [Turpentine, rosin, and fat from native conifers.] Wiener Allg. Forst- u. Jagd Zeitg. 38: 325-326. 1920.—The author discusses recent articles dealing almost entirely with the extraction of resinous materials from wood chips, sawdust, etc., by distillation.—*F. S. Baker.*

706. ALGAN, H. [Rev. of: HUFFEL, G. La forêt sainte de Haguenau en Alsace. [The sacred forest of Haguenau in Alsace.] 6 fig. Berger-Levrault: Nancy, Paris, and Strasbourg, 1920.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 289-296. 1920.

707. BALME, JUAN. Repoblando nuestro bosques, tendremos agua. [Conserve the water supply by reforestation.] Rev. Agric. [Mexico] 5: 522-525. 3 fig. 1920.—The Mexican forests are being rapidly cut to supply ties for the railroads and other demands for forest products. A plea is made for reforestation. *Eucalyptus* species are especially recommended for this purpose.—*John A. Stevenson.*

708. BARBEY, A. Die Rindenlaus der Weisstanne. [The bark louse of the white fir.] Schweiz. Zeitschr. Forstw. 72: 147-151. 1 pl. 1921.—It was generally conceded that the mixed forests and local groups of individual species in Switzerland were less subject to insect attack than the large areas of pure stands in Germany or Russia. However, during the past season alarming attacks of *Dreyfusia piceae* C. B. (*Chermes piceae* Ratz.), a relative of the German *Dreyfusia Nusslini* C. B., were noted in Jura and Aargau. The insect attacks the bark near the middle of the bole and farther up (also the smaller branches), causing drying and splitting of the inner bark and exudation of pitch. The tree finally dies, apparently from the drying of the wood rather than from the loss of leaves. The life history is not completely known. The spring form consists of dormant larvae and wingless females, and the summer form may be either the typical summer form or the migratory form of the female. A known remedy is to spray the summer form with a mixture of 1400 parts water, 30 of nicotine, and 100 of soap. The height at which the attacks are most serious makes spraying impracticable.—*J. V. Hofmann.*

709. BILLMANN, H. H. Nogle Bemærkninger om Jordbearbejdning med Motorkraft. [Notes on working the soil with motor power.] Dansk Skovforenings Tidsskr. 5: 226-230. Pl. 2. 1920.

710. ENGLER, ARNOLD. Untersuchungen über den Einfluss des Waldes auf den Stand der Gewässer. [Investigations to determine the influence of forests on stream flow.] Mitteil. Schweiz. Zentralanst. Forst. Versuchsw. 12: 1-626. 58 pl., 127 tables. 1919.—The importance of the relation of forests and run-off has long been recognized. The effects of the forest have been noted in various localities, although the specific relations of complete forest cover, partial cover, and denuded areas were not determined. The objects of this experiment were to determine the comparative run-off on a forested area and a non-forested area, with all other conditions as nearly equal as possible during (a) heavy showers, cloud bursts, (b) continuous long periods of rain, (c) rapid melting of snow, and (d) periods of drouth. The experiment includes 2 watersheds known as the Sperbelgraben and the Rappengraben. The former

contains 137 acres and has a complete forest cover on 97 per cent of the area, and the latter contains 172 acres, of which 35 per cent is covered with forest and shrubs, 26 with willow, and 29 with alpine alder and spruce in meadows; 8 per cent is in meadow and 2 under cultivation. Soil, vegetation, slope, elevation, springs, and all noticeable factors were considered. The elevation varies from 912 to 1261 meters. On each watershed 3 rain guages were placed at different elevations with a snow stake at each station. In addition, 8 snow stakes were established in 1915, 4 on shaded slopes and 4 on sunny slopes. They were grouped in pairs under mature conifers and hardwoods and young growth. These stakes were read twice each week at 8-9 in the morning. Temperatures were recorded at the stations of Kurzeneialp and Riedbad. Thermometers were placed on the shaded side of wooden buildings and read 3 times daily. Stream flow was recorded automatically at each control station from April 16 to November 30 of each year. The automatic recorders could not be depended upon during freezing weather. Variations in underground drainage or supply of water are considered negligible. The springs of the Rappengraben area (non-forested) are slightly stronger and more constant. However, the run-off from the forested area (Sperbelgraben) was greater during the dry summer periods than that of the non-forested (Rappengraben) area. The records show a total of 4-5 per cent greater precipitation in the Rappengraben than in the Sperbelgraben; also, the former retained a cover of snow for 143 days, the latter only 121 days. These differences are attributed to the location of stations. The snow readings in the Rappengraben were taken in a cove and are considered due to local conditions. Water content of the soil in the Rappengraben was slightly less in summer and greater in the fall than in the Sperbelgraben. The retention of water in the dry season is attributed to porosity of soil and prevention of run-off due to soil looseness brought about by roots and forest animals; and the smaller amount of water in the soil of the forested area during wet seasons is attributed to the duff preventing absorption after the humus and duff are wet, thereby causing greater run-off.—Individual showers caused about 50 per cent more run-off on the Rappengraben than on Sperbelgraben and the duration of run-off on the non-forested area was shorter. Evaporation from the forest floor was 1230 cubic meters per hectare per year, and in the open 3690 per year. Transpiration from the forest per year per hectare was 3000 cubic meters, from the meadow and cultivated plants 1300, and from the willow areas 650. The disposition of precipitation is summed up in the following tabulation:

	<i>Sperbelgraben;</i> <i>per cent of Precipitation</i>	<i>Rappengraben;</i> <i>per cent of Precipitation</i>
Run-off.....	59.3	61.9
Evaporation from vegetation...	14.5	11.8
Transpiration.....	18.9	8.1
Evaporation from ground.....	7.3	18.2
	100.0	100.0

Erosion was greater in the non-forested area and the stream carried more silt.—*J. V. Hofmann.*

711. GAJÓN, CARLOS. Una Acacia rica en tanina. [An Acacia rich in tannin.] Rev. Agric. [Mexico] 5: 442-443. 3 fig. 1920.—A brief account is given of *Acacia pycnantha* Benth., including botanical description, cultural directions, and analyses of the bark.—*John A. Stevenson.*

712. HENNE, A. VON. Einiges über den verteuerten Waldwegbau. [Concerning the cost of forest road building.] Schweiz. Zeitschr. Forstw. 72: 129-140. 1921.—The cost of forest road building has increased about 33 per cent during the last 25 years. Although wages have increased as much as 92 per cent, transportation and other costs have increased only 23 per cent. Forest roads should be built with a view to permanency, not only for the regions that they traverse, but also as an outlet for adjoining regions and those farther back. Width should not be sacrificed for length, although narrow roads of 2 meters width are sufficient for winter sled roads. Wheel-traffic roads should be 2.5 meters wide with turnouts, or 3 meters wide. Rocky and gravelly places should not be covered with rock surface except on main highways.

Better satisfaction and cheaper construction can be obtained through the small contractor; the machinery of the large operator is too cumbersome and expensive.—*J. V. Hofmann.*

713. HUFNAGL, HANS. Eine schwedische Kubikmassen-Ermittlungsmethode. [A Swedish method for determining volume.] Wiener Allg. Forst- u. Jagd Zeitg. 38: 331-332. 1920.—A brief discussion is given of Prof. TOR JONSON'S form factor methods and their basis.—*F. S. Baker.*

714. KOPETZKY, EUGEN. Ein Vorschlag zur Beförsterungsfrage. [A suggestion for forest administration.] Wiener Allg. Forst- u. Jagd Zeitg. 38: 243-244. 1920.—Owners of small woodlands are under considerable disadvantage in handling their holdings under the best methods of forestry and also in selling their products. The cure for this condition is frequently expressed as the "Nationalization" or "Socialization" of the forests. The author points out that the same ends may be accomplished through voluntary associations of small owners. Such associations might be loose at first and limited to cooperative purchases and employment of technical help. These associations, however, are capable of development into actual managers of the woodlands of the individuals on the basis of one large unit, thus securing every advantage that large forest owners have and also serving public interests much better. The formation of such associations can be stimulated by the extension of laws applying to large forests to small holdings, forcing them to unite for economical compliance with these laws.—*F. S. Baker.*

715. KRARUP. Sønderjydske Skovforhold. [Forest conditions in southern Jutland.] Dansk Skovforenings Tidsskr. 5: 217-226. 1920.—The author gives areas and general description of the forests in Schleswig-Holstein, territory recently acquired from Germany. The eastern forests are made up principally of beech, ash, and oak, with plantations of Sitka spruce and Douglas fir. In the central and western parts there is a predominance of red spruce and fir. These forests show the results of careless cutting incident to the demands of the war. Game animals are also considerably reduced.—*J. A. Larsen.*

716. KREIBICH, M. Kapitalstilgung. [Amortization.] Wiener Allg. Forst- u. Jagd Zeitg. 38: 273-274. 1920.—Rules and formulae are presented for determining certain values frequently needed but not included in tabular form, from values which are so given in the forester's handbooks or "calendars" current in Germany.—*F. S. Baker.*

717. KREUTZER, E. Neue Durch-forstungsgrundsätze. [New principles in thinning.] Wiener Allg. Forst- u. Jagd Zeitg. 38: 324-325. 1920.—In Württemberg it has been the practice of most private forest owners to thin stands, particularly fir, too lightly in an attempt to get a maximum number of stems per acre, and clear material rather than good crown development. This is intensified by the lack of a good market for poles removed in thinning. Crown width should equal $\frac{1}{4}$ the height of the tree on site quality I, $\frac{1}{8}$ on quality II, and $\frac{1}{8}$ on quality III. The factors, 7, 6, 5, used above are employed as spacing indicators from which the number of stems per unit area can be obtained by dividing the height of the trees by the appropriate "spacing indicator," and then dividing the area by the square of this quotient. The final yield in money depends upon basal area $\times$ height $\times$ form factor $\times$ value quotient. In practice the term "height times form factor" can be eliminated as it is nearly constant and attention must be centered upon basal area and quality, which are dependent in turn upon the number of stems per hectare.—*F. S. Baker.*

718. LOCKER. Vorschläge zur Beförsterung. [Proposals for forest administration.] Wiener Allg. Forst- u. Jagd Zeitg. 39: 18-19, 24-25. 1921.—The function of forests is to furnish wood, also protection to the soil, etc. In order to do this all forests should be under administration. In considering plans to accomplish this, 3 classes of forests may be recognized: A. Large private forests having wood production as their chief object. B. Encumbered forests, belonging to associations, cities, common property, etc., in which the object of management is complex. C. Small wood lands (private). The first problem is personnel.

In forests of class A and B there should be a forester for every 600 to 5000 hectares, with an assistant for every 600 to 1500 hectares; while in class C forests, forester for every 5000-10,000 hectares is sufficient. In class A and B forests the plans of management as proposed by owners should be presented to District Foresters for approval, while in class C forests the government will initiate the plans. In the latter associations of forest land owners are very necessary to economical and easy administration. A full administration is outlined from State Forester down through various grades, together with councils of different degrees of authority. The distribution of costs of administration in different classes of forests and kinds of work is outlined.—*F. S. Baker.*

719. MUUS, F. Forsyndelser mod Skovnaturen ved vor Almindelige Skovdrift. [Sins against nature in our present forestry practice.] Dansk Skovforenings Tidsskr. 6: 1-16. Pl. 1. 1921.—The present way of managing the forests by even-aged stands and clear cutting is detrimental to production because: (1) The soil is too much exposed to sun and wind, thereby losing the natural vegetation, moisture, and loose texture of the soil; (2) the borders of the forests suffer injury by exposure to sun and wind; (3) the openings incident to clear cutting retard growth of the younger age classes; (4) in the older high forests too many trees lack suitable light or space for ideal development; (5) the present practice places too much emphasis on direct sunlight; the diffuse light, shelter, and increased moisture of the soil secured by selection cuttings give better results. It is known that the 1st rotation after clear cutting produces poorer, shorter trees than the 2nd rotation in a natural forest. The author cites excellent results obtained by selection and shelterwood methods at Polenzka-Börentshoren in Germany, where since 1884 this method has increased the yield of the forest from 1.5 to 3.3 cubic meters per hectare per year, and raised the quality of the site from IV to II.—*J. A. Larsen.*

720. MUUS, F. Meddelelse fra Handelsudvalget. [Report of the Department of Commerce.] Dansk Skovforenings Tidsskr. 5: 248-265. 1920.—Abstracts are presented dealing with prices, amounts, and general market conditions for lumber and fuel woods.—*J. A. Larsen.*

721. PODHORSKY, J. Der Wald als Regulator des Abflusses und Standes der Gewässer. [The forest as a regulator of the run-off of water.] Wiener Allg. Forst- u. Jagd Zeitg. 38: 267-269. 1920.—The idea of control of torrential run-off by forests has been doubted lately in some quarters. The author undertakes to point out the definite advantages of run-off control through forests, by citing the work of the Swiss forest experiment station. The bulk of the article is a review of this work from the report of ARNOLD ENGLER [see Bot. Absts. 9, Entry 710].—*F. S. Baker.*

722. RAFFN, JOHANNES. Skovfröanalyser i Säsonen 1919-20. [Analyses of forest tree seeds 1919-20.] Dansk Skovforenings Tidsskr. 6: 17-18. 1921.

723. RITTMAYER. Der Schutzwald. [The protection forest.] Wiener Allg. Forst- u. Jagd Zeitg. 39: 23-24. 1921.—The legal definitions of protection forests are reviewed and in all there is a clear intent to limit such forests to steep mountainous country where heavy cutting would result in avalanches, snowslides, and destructive erosion. The author proposes to extend the definition to cover all forest lands where reproduction is difficult, automatically restricting cutting in these lands to the degree allowed in the usual protection forests and thus assuring adequate reproduction. It is pointed out that many rocky, dry areas within forests are becoming treeless under present methods of cutting and are reforested only with extreme difficulty.—*F. S. Baker.*

724. S., A. Valeur d'avenir. [Future value.] Rev. Eaux et Forêts 59: 71-72. 1921.—In calculating the future value, as a basis for reparations, of trees destroyed by the Germans, it is helpful to make use of PRESSLER's famous trinomial ($a + b + c$), in which a represents the per cent of current volume growth of the tree, b the per cent of increase in quality resulting from increase in size, and c the per cent of increase in value resulting from rising prices

of wood. Trees over 40 cm. in diameter usually have no future value because for larger trees b is negative, making the sum of $a + b$ less than c . The great and definitely known increase in price during the last seven years, however, gives a positive future value to trees up to 60 cm. in diameter. In the case of young oak standards for this period c amounts to 15 per cent, to which may be added 2 per cent for current annual volume growth (a), making a total of 17 per cent even if b is ignored entirely.—*S. T. Dana*.

725. SAMMEREYER, HANS. *Zirbenkulturen*. [Swiss stone pine (*P. cembra*) culture.] *Wiener Allg. Forst- u. Jagd Zeitg.* 38: 332-333. 1920.—*Pinus cembra* has good possibilities for planting in the Tyrol region. The wood is in high demand for charcoal in local smelters and many high mountain forests have been devastated on account of this demand. Toward the upper range of fir and larch it is often difficult to get successful plantations, but the establishment of Swiss stone pine is easy, and larch and fir are later introduced with ease,—the stone pine is choked out in a few years. The real field of usefulness of the species is at higher elevations (above 1800 meters), where it is virtually the only species that develops rapidly. Planting is much superior to sowing on account of the abundance of rodents and birds which destroy the seed; but in exceedingly rocky sites a combination of sowing and planting seems best as seedlings can establish themselves among the rocks where holes cannot be dug. While this species succeeds in the open, it does much better in the protection of rocks, hummocks, and old stumps. Four to 6 year old seedling stock, as a rule raised in nurseries near the planting site, is generally used. Rodents and jays are the chief enemies of such nurseries; the former are combatted by the use of typhus bacilli, the latter by wooden lattice work over the beds.—*F. S. Baker*.

726. SIM, T. R. *Timber trees for commercial culture*. *South African Jour. Indust.* 3: 1030-1039. 1920.—A list is presented of trees that have been tried in Natal, with notes on success or failure.—*A. J. Pieters*.

727. VESTERGAARD, N. *Dansk Skovforenings Opvisning af Skovmaskiner og Redskaber i Haslev-Orned Skov den 17. April 1920*. [Demonstration of machinery for use in forestry operations at Haslev-Orned forest April 17, 1920. Under auspices of the Danish forestry association.] *Dansk Skovforenings Tidsskr.* 5: 231-247. *Pl.* 13. 1920.

728. WEIR, JAMES R. *The mucilage of mistletoe berries as an adhesive*. *Phytopathology* 11: 99. 1921.—A method is given for the preparation of mucilage from the berries of *Phoradendron*, *Viscum*, and related genera.—*B. B. Higgins*.

GENETICS

GEORGE H. SHULL, *Editor*

JAMES P. KELLY, *Assistant Editor*

(See also in this issue Entries 587, 594, 596, 598, 603, 613, 617, 627, 630, 639, 647, 685, 695, 697, 785, 789, 792, 807, 816, 823, 832, 840, 851, 871, 876, 941, 1100)

729. ANONYMOUS. *Mutations and evolution*. [Rev. of: GATES, R. *Mutations and evolution*. *New Phytol.* 19: 26-34, 64-88, 132-151, 172-188, 213-253. 1920.] *Nature* 107: 636-637. 1921.

730. ANONYMOUS. *The pollination of Incarvilleas*. [Rev. of: CUTTING, E. M. *On the pollination mechanism of Incarvillea Delavayi*, Franch. *Ann. Botany* 35: 63-71. 3 fig. 1921.] *Gard. Chron.* 69: 97. 1921.

731. AGAR, W. E. *Cytology with special reference to the metazoan nucleus*. *xii + 224 p.* Macmillan & Co.: New York and London, 1920.—A condensed general treatise on the subject indicated by the title is presented. The author contrasts parasynesis and telosynesis,

considering the former proven, the latter perhaps possible in some organisms. "Mutual relations of chromosomes" in syndesis are discussed, it being considered probable that homologous chromosomes fuse at this time. Syngamy, gonomey, and fragmentation of chromosomes are discussed; also parthenogenesis—facultative and obligatory, haploid and diploid. Cases are cited of diploid parthenogenesis with 2 maturation divisions (*Nematus*, *Rhodites*). Sex chromosomes in insects are considered in detail and compared with those of other animals. Special life histories are described; alternation of parthenogenetic and sexual generations are considered with reference to chromosome behavior. Relation between sex chromosomes and sex determination are briefly considered with the conclusion that in every individual "both sexes must be considered as potential," but in most cases sex chromosomes are "overwhelmingly the most important immediate factor in sex determination." In rare cases, "other factors may be more powerful." Actual influence of sex chromosomes in determining sex is unknown, but the result is probably not due to differences in the mass (amount) of chromatin. Sex is probably due to hereditary factors residing in the chromosomes. Evidence for genetic continuity of chromosomes is reviewed and the principle is accepted. Homology of chromosomes is discussed. Possible modes of evolution of chromosomes are considered, i.e., fractionation, fusion, tetraploidy, etc. The author reviews evidence indicating that chromosomes are the main vehicles by which "hereditary qualities are transmitted from parent to offspring," and that they initiate and control activities of cell and morphogenesis. A discussion of chromosomal behavior in hybrids is included; also a brief treatment of crossing over and mutation phenomena including somatic mutations. Morphogenesis is immediately affected by "organ-forming substances" of cytoplasmic nature, but is ultimately controlled by the nucleus. Chromidia are considered, with the conclusion that their origin is in doubt and their function not clear. Chondriosomes, which may be identical with chromidia, are likewise of doubtful origin; there is practically no evidence that they reproduce regularly by fission or that they are equally and regularly distributed in cell division. They are probably not the seat of morphogenetic factors, and are not, on the basis of present knowledge, to be considered as idioplasmic. The final chapter is devoted to nuclei of Protista and plants. Chromatin-cytoplasm differentiation may be lacking in some bacteria. "Modes of nuclear multiplication in the Protista are of bewildering variety." Recent evidence renders supposed cases of amitosis in Protista doubtful. Likewise the supposed non-qualitative divisions of chromatin by means of chromidia are somewhat doubtful. Polyploid nuclei occur in certain stages of some Protista; e.g., the radiolarian *Aulacantha* has one chromosome in some nuclei, over 1,000 in others; both types apparently carry a full set of hereditary factors. Meiotic phenomena in plants are essentially similar to those in animals. Differences between animals and plants are discussed, especially variations in prominence of haploid (gametophyte) generation in plants. [See also Bot. Absts. 7, Entry 850.]-C. W. Metz.

732. ALVERDES, FRIEDRICH. Zum Begriff der Scheinvererbung. [The concept of false heredity.] Zeitschr. Indukt. Abstamm.- u. Vererb. 25: 164-169. 3 fig. 1921.—The term "false heredity" is applied to a change produced in a line of descent by changed surroundings, which change remains for as many generations as the change in the surroundings persists so that the line of organisms comes back to normal only when, or a few generations after, the surroundings again become normal. Thus, non-heritable changes are classed as changes in the environment, and heritable changes as changes of the genotype. The problem of inheritance of acquired characters therefore becomes the problem of changes in the genotype produced by changes in the surroundings.—John Belling.

733. BANNIER, J. P. [Dutch rev. of: ALLEN, E. J., AND E. W. SEXTON. Eye-colour in *Gammarus*. Jour. Genetics 9: 347-366. 1 pl., 1 diagram. 1920 (see Bot. Absts. 7, Entry 840).] Genetica 3: 63-64. 1921.

734. BANNIER, J. P. [Dutch rev. of: JONES, D. F. Selective fertilization in pollen mixtures. Biol. Bull. [Woods Hole] 38: 251-289. 1920 (see Bot. Absts. 6, Entry 1699).] Genetica 3: 68-70. 1921.

735. BAUMANN, E. Zur Frage der Individual- und der Immunitätszüchtung bei der Kartoffel. [The question of individual selection and breeding for immunity in potatoes.] *Fühlings Landw. Zeitg.* 67:246. 1918.—An analysis of the difference in yield shown by 2 potato varieties, "Auf der Höhe" and "Industrie" is presented. Industrie was more consistent in yield, showing an average range in yield per plant in grams of 380 as compared with 580 for Auf der Höhe. This difference was ascribed to a lessened influence of environment on the former variety.—Differences in degree of resistance to diseases were also quite marked. Auf der Höhe was affected with chlorosis and *Phytophthora*, while Industrie showed curly-dwarf and mosaic; both varieties were affected with leaf roll. Diseased plants of Auf der Höhe, however, showed only about $\frac{1}{2}$ as much reduction in yield as diseased plants of Industrie when compared with healthy plants of the respective variety.—The author emphasizes the need of thorough study of the morphological and physiological characters of the numerous varieties on the market to determine the most resistant and highest-yielding ones.—C. M. Woodworth.

736. BAUR, E. [German rev. of: FRUWIRTH, C. *Handbuch der landwirtschaftlichen Pflanzenzüchtung. Allgemeine Züchtungslehre der landwirtschaftlichen Kulturpflanzen.* (Handbook of agricultural plant breeding. General genetics of agricultural plants.) xviii + 442 p., 8 pl., 89 fig. Parey: Berlin, 1920.] *Zeitschr. Bot.* 13: 313-314. 1921.

737. BECKER, WERNER H. Was wird aus den Kindern alter Erstgebärender? Ein Beitrag zur Vererbungslehre. [What becomes of the children of mothers who bear their first child late in life? A contribution to genetics.] *Arch. Rass.- u. Gesellschaftsbiol.* 13: 277-297. 1921.—Do the offspring of parents of advanced age possess a neuropathic constitution? Data were collected by mail from women (mothers) who had visited the clinic at Giessen University. Eighty-five were primipara, 35 years old or over; and of these 62 were married. Among the 85 there were 17 still births,—a rate about 6 times higher than that of all first births in Berlin (1898) (—WINKEL). The sex ratio was 47 males to 39 females. The birth weight was on the average slightly less than that of early first born. According to the answers to the questionnaire, 24 children were normal, 3 imbecile, 3 epileptic, and 7 psychopathic. The author gives 16 additional cases of histories collected from physicians. He considers briefly the biological meaning of his results, but draws no general conclusions. His data are presented in detail.—C. C. Little.

738. BLACKBURN, KATHLEEN B., AND J. W. HESLOP HARRISON. The status of the British rose forms as determined by their cytological behavior. *Ann. Botany* 35: 159-188. Pl. 9-10, 5 fig. 1921.—In the rose the fundamental chromosome number is 7. *Rosa arvensis* and *R. rugosa* are diploid types; *R. pimpinellifolia* and all of the Villosae are tetraploid; the Eucaninae, Afzelianae, Rubiginosae, and Tomentosae are pentaploid; and a hybrid of *R. pimpinellifolia* × *R. tomentosa* var. *sylvestris* is found to be hexaploid. All of the diploid types examined are found to be of normal behavior during meiosis. Most of the tetraploid forms and all of the pentaploid and hexaploid ones show a partial reduction involving 14 or 28 chromosomes. In these groups the heterotypic division is equatorial as far as the bulk of its chromosomes is concerned but reductional with a fixed proportion, generally 14 and sometimes 28. The anaphase of the heterotypic division occurs in 2 steps, one involving the reduction and the other the splitting of the univalent chromosomes. In many cases the split univalent chromosomes fail to reach the poles, and form micronuclei. Multinucleate pollen grains are common in the anomalous forms of the genus. Known hybrids in many genera exhibit the same type of abnormal behavior as is shown by these forms of roses. The close similarity between the two leads the authors to the statement that every rose studied, showing partial reduction, is of hybrid origin. All of the abnormal roses are facultatively apomictical, and this is attributed to latent hybridity. Natural hybrids are instrumental in building new microgenes (Jordanian species) of the rose. [See also Bot. Absts. 9, Entry 745.]—A. C. Fraser.

739. BORING, EDWIN G. Predilection and sampling of human heights. *Science* 52: 464-466. 1 fig. 1920.—The author presents a distribution of the heights of 221,819 men (insurance data) and shows that the curve has a remarkable inversion near the peak, there being fewer

men of height 5 ft. 9 in. than there are of height 5 ft. 8 in. or 5 ft. 10 in. He shows that this is not due to the inclusion of men of different ages, since it occurs in 10 of the 13 age groups (5-year groups) taken separately. He also points out that it is not due to a predilection for even heights. The instance shows how difficult it is to obtain an "unselected sample" by merely securing large numbers without scientific control of the original observations.—*L. J. Reed.*

740. BRIDGES, CALVIN B. Gametic and observed ratios in *Drosophila*. *Amer. Nat.* 55: 51-61. 1921.—Lack of correspondence between gametic series and observed classes in genetic work with *Drosophila* depends largely on 3 factors: (1) The viability of the mutant type and character combination; (2) the suitability of the culture medium and other environmental conditions; (3) the competition due to over-crowding. The last can be met by concentrating on a few cultures in which food is provided in abundance. To meet (2), it has been found that a 1 per cent banana agar (equal amounts of banana and water) gives the most satisfactory culture medium for breeding large numbers of flies. For lessening or eliminating the effects of poor viability of certain mutant characters or character combinations, the most successful method found is that of making up "alternated stocks" such that the characters are divided as evenly as possible between the 2 parents of the cross. When the F_1 progeny are back-crossed to the multiple mutant stock, their offspring, from which the linkage ratios will be calculated, show a very small percentage of inviable combinations, and these tend to balance each other. Such methods are constantly making the genetic results in *Drosophila* more accurate.—*H. H. Plough.*

741. CLEGHORN, MAUDE L. First report on the inheritance of visible and invisible characters in silkworms. *Proc. Zool. Soc. London* 1918: 133-146. 1918.—Crossing multivoltine and univoltine races resulted in producing F_1 generations which differed from each other in that these generations were multivoltine or univoltine depending upon the character of the mother, that is, each of these generations followed the female parent. The results of numerous crossings of various kinds lead the author to conclude that the maternal parents are dominant in the univoltine and multivoltine character, respectively, and that these characters are inherited from the paternal grandparent in which they were dominant characters. Crossing races differing in cocoon size resulted in producing largest average size of cocoons in every 3rd generation. Crossings for cocoon (silk) color show that the inheritance of this character is clearly Mendelian.—*Vernon Kellogg.*

742. DETLEFSEN, J. A. Is crossing over a function of distance? *Proc. Nation. Acad. Sci. [U. S.]* 6: 663-670. 1920.—It is a current concept of recent genetics that genes may be given definite loci on chromosome maps, on the basis of the percentage of crossing over between them. It is believed that these maps roughly indicate the actual distances apart of the genes in the chromosome. Certain experiments involving selection of strains of *Drosophila* showing high and low crossing over between white and miniature in the sex chromosome throw doubt on the validity of this hypothesis. The stock originally showed about 33 per cent crossing over, but as a result of selection in a minus direction this percentage was reduced to 0 (no crossing over) in 10 generations in 1 line, and to 6 after 28 generations in another. These stocks when inbred continued to give this reduced percentage of crossing over. Selection for increased crossing over was ineffective. Crosses of a strain giving 6 per cent crossing over with the original stock gave F_1 females which showed a percentage about midway between the two. The evidence indicates that the percentage of crossing over in this case is a "variable which is determined by the different possible combinations of multiple modifying factors." The author concludes that "crossing over is not necessarily proportional to distance," that "distance between two genes may remain fairly constant, but the amount of crossing over depends on numerous hereditary factors."—*H. H. Plough.*

743. FEDERLEY, HARRY. Die Bedeutung der polymeren Faktoren für die Zeichnung der Lepidopteren. [The significance of polymeric factors for coloration in Lepidoptera.] *Hereditas* 1: 221-269. 9 fig. 1920.—The black aberration, *zatima*, of the arctiid moth, *Spilosoma*

lubricipeda, crossed with the yellowish-white type produces var. *intermedia*, which inbred gives a 1:2:1 ratio (1 *zatima*, 2 *intermedia*, 1 *lubricipeda*). A single factor, *Z* or *z*, differentiates them, promoting the development of black pigment much more vigorously in the homozygote than in the heterozygote. The great variability of *intermedia* and of *zatima*, and the rapid + or - effect of selection in a series of either variety, leads to the conclusion that a series of polymeric (modifying) factors influence *Z* in such wise that in *Zz* (*intermedia*) they act strongly, in *ZZ* (*zatima*) less strongly, and in *zz* (*lubricipeda*) negligibly; the number of these factors has not yet been determined. They control the distribution of the black pigment in different ways and hence are not homomeric. Evidences of action of polymeric factors were seen also in *S. menthastris*, *Cerula furcula*, and the *Leucodonta bicoloria-albida-unicolora* series.—Consideration of polymeric factors in moths leads to the conclusion that species are only apparently constant, consisting mainly of complex heterozygotes. Rare combinations of genes give "varieties"; the rarest, "aberrations." Homozygous combinations of polymeric factors, either dominant or recessive, producing the most extreme biotypes, occur in nature only with extreme rarity.—Critical examination of the supposed production of aberrations in *Arctia caja* by exposing pupae to cold shows that this genetically highly variable form is most unfavorable for such experiments, that the subsequent inheritance under normal temperatures by a few individuals of the aberrations supposed to be due to cold or heat is due to the combination in these individuals of polymeric intensity factors and is not "inheritance of acquired characters."—Selection for homozygous *zatima* soon reaches its limits; wing veins remain white. Hence the completely black aberration, *deschangei* Depuiset, is probably due to a special gene, not the result of cumulative selection of polymeric factors.—*Zatima* was recorded in 1782, *intermedia* not till 1890–1899, and the author assumes that the earliest described *zatima*, unlike most melanics on first appearance, was homozygous [though dark *intermedia* individuals are as black as *zatima*]. Polymeric factors so alter the phenotype as literally to change white into black and lead to false conclusions regarding environmental versus hereditary control of development, especially in man and other mammals which afford relatively small numbers of individuals of the stock in question.—John H. Gerould.

744. FRETZ, G. P. [Dutch rev. of: BRYN, H. Trondelagens Antropologi. (Anthropology of Trondhjem.) K. Norske Videnskab. Selskab. 1917. IDEM. Researches into anthropological heredity. Hereditas 1: 186–212. 1920 (see Bot. Absts. 7, Entry 1732).] Genetica 3: 66–68. 1921.

745. HARRISON, J. W. HESLOP. The genus *Rosa*, its hybridology and other genetical problems. Trans. Nat. Hist. Soc. Northumberland, Durham, and Newcastle-upon-Tyne 5: 244–298. Pl. 8–22, 2 fig. 1921.—A study of a few closely related species of roses along with their allied forms from various sections of the country shows that the types merge imperceptibly into each other, thus forming a "linked-up series of groups," with each group separable from its neighbors by its own special characters. Further investigation shows that these chains of groups are of common occurrence. Each chain is definitely divided from the next. The writer considers each of these chains as being very close to a species in the Linnaean sense, though he believes that most taxonomists would accord them the rank of a section or subsection. The members of the chain are here considered as Jordanian species, or "microgenes," as the writer calls them. The chains are called "section-species." Eight of these section-species are recognized. Each species type is common to all section-species, seeming to indicate an orthogenetic trend of development in the evolution of the rose. Thus a table can be constructed, similar to MENDELEEFF's Periodic Table, with the section-species as vertical groups and the species types as horizontal groups.—A careful study of the pollen of a number of roses reveals the fact that of 36 wild species and 2 garden hybrids produced from wild species, only 4 possess perfect pollen, while 75 per cent of them have less than half their pollen grains perfect, and about 40 per cent of them have less than 10 per cent of pollen capable of fertilizing ovules. Seven forms produced practically no good pollen. The conclusion is reached that pollen sterility is the outcome of latent hybridity. The pollen of *R. rugosa* and *R. cinnamomea*, 2 fairly well isolated species, seems to be largely perfect. In default of out-

side agencies, there is an automatic self-pollination of flowers in the rose at an early hour in the morning. While cross-pollination can occur, there is a surprising amount of selfing, much of it being accomplished by thrips. A number of cleistogamous flowers were found in *R. omisssa*. Experiments have shown that practically all of the local rose microgenes depend upon self- or cross-pollination for the setting of seed and in the event of failure of these are, to some extent, facultatively apomictical. DINGLER has already demonstrated apomixis in a form of *R. rubiginosa*, and LUNDSTRÖM in *R. glauca* and *R. coriifolia*. The writer holds that such apogamy as is found in the rose has its origin in hybridity. Some polyembryony is reported and various natural hybrids of roses are described. [See also Bot. Absts. 9, Entry 738.]-A. C. Fraser.

746. HERWERDEN, M. A. VAN. [Dutch rev. of: SEILER, J. Geschlechtschromosomen-Untersuchungen an Psychiden. I. Experimentelle Beeinflussung der geschlechtsbestimmenden Reifeteilung bei *Talaeporia tubulosa* Retz. (Sex chromosome investigations on psychids. I. Experimental influencing of sex-determining maturation division in *Talaeporia tubulosa* Retz.) Arch. Zellforsch. 15: 249-268. 1 pl. 1920 (see Bot. Absts. 7, Entry 1836).] Genetica 3: 79-81. 1921.

747. HÖPPLI. [German rev. of: CHRISTELLER, E. Untersuchungen an künstlich hervor-gebrachten Hermaphroditen bei Schmetterlingen. (Investigations on artificially produced hermaphrodites among Lepidoptera.) Schrift. Phys. Ökonom. Ges. Königsberg 59: 1918.] Centralbl. Allg. Path. 30: 512-514. 1920.

748. KING, HELEN DEAN. A comparative study of the birth mortality in the albino rat and in man. Anat. Rec. 20: 321-354. 1921.—The normal percentage of still births in rats for 31,670 births is 1.31. After correction, 2 per cent seems the high limit. For man numerous data ranging from 3.04 per cent to 5.67 per cent are given. The indications are that in higher mammals from 2 to 4 per cent of full-term fetuses are dead. The sex ratio of normal living rats is apparently 104.1 males to 100 females; this, however, is subject to corrections which makes 107 a more nearly correct estimate. In 415 still births (same material) the sex ratio was 129.3. The human sex ratio of living births shows a norm of about 105.5. The sex ratio of 13,635,986 still births (NICHOLS) is 131.6. The author estimates the primary sex ratio and criticizes MORGAN's hypothesis to explain the constant sex ratio in man. He also considers the evidence that the season influences the percentage of still births but concludes that such influence is negligible. In rat and man early postnatal mortality is about the same and is "somewhat higher" than the birth mortality. Causes and extent of birth mortality are given as follows: (a) Malposition of fetus and disease, about 1 per cent of human fetuses (MALL) but very rare in rats,—4 in 50,000. (b) Size of fetus, "important" in humans but not operative in rats. (c) Physical condition of mother, probably important in rats. (d) Age of mother: Very old rats and both very young and very old human mothers appear to give higher percentage of still births than those at zenith of reproductive period. (e) Congenital debility, over 50 per cent in humans and "practically all" cases in rats. The author discusses the control of percentage of still births and believes fetal nutrition to be an important factor; age of mothers is probably operative as a factor through this same medium of nutrition. Since the earlier the embryonic age, the greater the excess of male abortions that occur, "inadequate nutrition cannot be considered as the primary cause of the greater mortality among male fetuses in general." LILLIE's hypothesis of influence of sex hormones of mother on mortality of male fetuses is discussed. Inherent dissimilarity of sexes as regards constitutional vigor may have a basis in the amount of chromatin possessed by the ovum. The assumption is made that, from conception, the embryo that is to be a male has a constitution "inherently weaker" than the embryo that is to become a female; on this basis experimental facts may be explained.—C. C. Little.

749. KOLTONSKI, HERMANN. Über Erbllichkeit der Ovarial-, besonders der Dermoid-cysten. [On the inheritance of ovarian cysts, especially the dermoid cysts.] Zeitschr. Krebsforsch. 17: 408-416. 1920.—Five patients belonging to 2 families are considered. I. (a)

Female, 44 years old (father and 3 sisters out of 5 sibs have died of carcinoma of the digestive tract). Both ovaries were enlarged, cystic, left side having dermoid cyst with hair, pulp, teeth, and a dermoid villus.—(b) Female, 19, daughter of (a), had cyst on left side, behind uterus,—right ovary the size of a hen's egg, not adherent, with smooth, walnut-sized cyst on lateral half. The larger cyst, excised, showed, on sectioning, oily pulp with short black hairs, and a piece of bone developed from cartilage, with two teeth. The author discusses the probability of inheritance.—II. (a) Female, 41 years old. From the rear end of the uterus a subserous myoma, the size of a goose egg, occurred.—(b) The 15-year-old daughter of II (a). An operation revealed a dermoid cyst on the right side as large as a man's head, and, over it, the thickened tube. Most of the tumor was cystic with serous contents; only in one place was dermoid pulp and a villus present.—(c) The sister of II (b) had a parovarial cystic tumor (the size of a child's head), which was excised with the tube.—The author considers the theories of the origin of the 3 types of tumors here considered. He believes that they may support BILLROTH's hypothesis of a general cancer diathesis. This theory and the possible factors underlying tumor formation are discussed. The author believes that there is an hereditary disposition to tumor formation which is general in nature,—the type of tumor in the special case being due solely to chance.—*C. C. Little.*

750. LEK, VAN DER. [Dutch rev. of: NILSSON-EHLE, H. *Über Resistenz gegen Heterodera Schachtli bei gewissen Gerstensorten, ihre Vererbungsweise und Bedeutung für die Praxis.* (On the resistance to *Heterodera Schachtli* in certain varieties of barley, its method of inheritance, and significance for agricultural practice.) *Hereditas* 1: 1-34. 4 fig. 1920 (see Bot. Absts. 6, Entry 1731).] *Genetica* 3: 71-72. 1921.

751. LOEB, JACQUES. Further observations on the production of parthenogenetic frogs. *Jour. Gen. Physiol.* 3: 539-545. 3 fig. 1921.—Over 20 parthenogenetic frogs, produced by puncturing unfertilized eggs, have been raised to advanced and adult stages. The occurrence of both sexes suggests that, in the frog, the female is heterozygous for sex. The males possess 26 chromosomes, the diploid number. Accidental fertilization of eggs was excluded by mode of procedure and only the punctured eggs developed. The diploid number may have been produced either by retention of the second polar body or premature division of chromosomes without cell division. The number of chromosomes in female parthenogenetic frogs is unknown but both diploid and haploid numbers have been reported from tadpoles too young for sex determination. Many parthenogenetic tadpoles did not metamorphose although growth was normal. One over a year old was made to metamorphose in 2 weeks by feeding thyroid gland from cattle.—*J. L. Collins.*

752. LOTSY, J. P. [Dutch rev. of: SAKAMURA, T. *Experimentelle Studien über die Zell- und Kernteilung mit besonderer Rücksicht auf Form, Grösse und Zahl der Chromosomen.* (Experimental studies on cell division and nuclear division with special reference to form, size, and number of the chromosomes.) *Jour. Coll. Sci. Imp. Univ. Tōkyō* 39¹¹: 1-221. 7 pl., 24 fig. 1920 (see Bot. Absts. 7, Entry 1844; 8, Entry 330).] *Genetica* 3: 72-77. 1921.

753. MALINOWSKI, EDMUND. Die Sterilität der Bastarde im Lichte des Mendelismus. [The sterility of hybrids in the light of Mendelism.] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 22: 225-235. 1920.—The author made crosses between different types of *Triticum vulgare* and *T. dicoccum* and determined the degree of fertility of the offspring by dividing the number of seeds by the number of spikelets in the head. F_1 was morphologically intermediate between the parents. In F_2 , new forms appeared, whose characters were inheritable. F_2 showed more partly or wholly sterile plants than fertile, and the greatest number of individuals with relatively high degree of sterility. The results show very little evidence of interdependence between morphology and sterility. A study of F_3 shows that different degrees of partial sterility are inheritable.—The author criticises BELLING's theory that sterility in hybrids is due to the genetic composition of individual spores or gametes and proposes instead the theory of genes or inharmonious elements meeting in a hybrid which act as complements to produce

partial impotence of the plant as a whole. The impotence of individual spores and gametes is hence considered to be independent of their own composition. The grade of impotence is assumed to be determined for the zygote as an individual, and the association of a lesser or greater number of pairs of complementary genes decreases or increases the impotence.—*Hester M. Rusk.*

754. MALINOWSKI, EDMUND. *Studia nad Mieszcancami Pszenicy*. [Studies on wheat hybrids.] *Prace Towarzystwa Naukowego Warszawskiego* 30. 220 p., 10 pl., 33 fig. 1918. [Polish, with French translation.]—A study of crosses of lax, squarehead, and compact types of *Triticum vulgare*, with lax, square, and semicompact types of *T. dicoccum*. Seventeen crosses are described as to their behavior in F_1 and F_2 . Ninety-six selected F_2 progenies are described in the F_3 . Aside from the parental types, other forms appeared in the F_2 ,—*Triticum spelta*, *T. turgidum*, *T. durum*, some very similar to *T. polonicum*, and 2 new forms, *T. ellipiticum* and *T. lanceolatum*. All these forms are distinguishable by the shape and size of their glumes and spikelets. The author attributes the size and shape of the glumes and spikelets to the presence or absence of cumulative factors. Size and shape of grain are related to the size and shape of the glume. Partial or complete sterility is explained on the basis of Mendelism through 2 or more discordant factors meeting in the same individual. The degree of sterility depends on the number as well as the quality of these factors. Three types of inheritance are obtained as regards length of head, giving ratios of 1 : 2 : 1, 3 : 1, and 15 : 1. These are found by intercrossing to be related and the factors concerned are complementary.—*R. Summerby.*

755. MARIE-VICTORIN, FR. *La vie sexuelle chez les Hydrocharitacées*. [The sexual life of the Hydrocharitaceae.] *Nat. Canadien* 45: 130–133. 1919.—The method of pollination in *Vallisneria* is discussed, comparing the statements of MIGNAULT [see Bot. Absts. 3, Entry 1112] with the generally accepted ideas. The author describes the liberation and opening of the staminate flowers of *Philonotria canadensis* (Michx.) Britton (*Elodea canadensis* Michx.) and the opening and pollination of the pistillate flowers, his observations agreeing essentially with those of WYLIE (The morphology of *Elodea canadensis*. *Bot. Gaz.* 37: 1–22. 1904). [See also Bot. Absts. 3, Entry 1111.]—*C. E. Allen.*

756. MORGAN, T. H. *Variation in juvenile fiddler crabs*. *Amer. Nat.* 55: 82–83. 1921.—The author replies to Miss RATHBUN's criticism [see Bot. Absts. 9, Entry 759] of his former paper (*Amer. Nat.* 54: 220–240). He states that these "small crabs with narrow abdomen were stated in my paper to show either a change toward maleness or possibly a retention of the juvenile condition," that out of more than 3000 individuals that were collected only a few showed the narrow abdomen, and that with considerable reservations he had ventured to call these intersexes because the variation in question was in the direction of a character peculiar to the opposite sex.—*A. M. Banta.*

757. NORTHROP, JOHN H. *Concerning the hereditary adaptation of organisms to higher temperature*. *Studies Rockefeller Inst. Med. Res.* 36: 259–264. 1921.—Reprinted from *Jour. Gen. Physiol.* 2: 313–318. 1920 [see Bot. Absts. 5, Entry 433].—*Geo. H. Shull.*

758. P[OPENOE], P[AUL]. [Rev. of: GRUENBERG, BENJAMIN C. *Elementary biology*. x + 528 p., 26 fig. Ginn & Co.: Boston, 1919 (see Bot. Absts. 3, Entry 1902).] *Jour. Heredity* 12: 41. 1921.

759. RATHBUN, MARY J. *On intersexes in fiddler crabs*. *Amer. Nat.* 55: 80–82. 1921.—The author criticizes MORGAN's interpretation of exceptional fiddler crabs as intersexes rather than juvenile states, asserting that he has ". . . thereby seemingly robbed the female fiddler of its period of adolescence." [See also Bot. Absts. 9, Entry 756.]—*A. M. Banta.*

760. SCHWEISSEIMER, W. *Bevölkerungsbiologische Bilanz des Krieges 1914-19*. [Population effects of the war 1914-1919.] Arch. Rass.- u. Gesellschaftsbiol. 13: 176-193. 1920.—This paper reports studies of the effect of the world war on population, considering losses both from deaths and from decrease of births. Tables are given to show the losses under these heads for all of the important countries of Europe. The last part of the paper is devoted to a discussion of the ratio of males to females, showing the decrease in the ratio between 1913 and 1919.—*L. J. Reed*.

761. SIRKS, M. J. [Dutch rev. of: SCHMIDT, JOHS. *Racial investigations*. IV. The genetic behavior of a secondary sexual character. Compt. Rend. Trav. Carlsberg Lab. 14^s: 1-12. Pl. 1-5 (colored). 1920.] *Genetica* 3: 77-79. 1921.

762. SKUPIENSKI, F.-X. *Sur la sexualité chez une espèce de Myxomycète Acrasiée, Dictyostelium mucoroides*. [Sexuality of a species of Acrasiales, Dictyostelium mucoroides.] Compt. Rend. Acad. Sci. Paris 167: 960-962. 1918.—The germination of the spore (in culture) is followed immediately by a motile amoeboid stage. There is no ciliated phase. The myxamoebae multiply, the nuclear division being karyokinetic, the chromosome number 4. After a series of divisions, the uninucleate myxamoebae, now relatively large and vacuolate, become arranged in pairs and fuse. Fusion of the cytoplasm is followed by that of the nuclei. The zygotes become massed together and sporulation follows.—*C. E. Allen*.

763. SLOCUM, R. R. *Methods of pedigree breeding at the government poultry farm*. Amer. Poultry Advocate 28: 435-437. 8 fig. 1920.—A brief popular article that contains nothing new.—*H. D. Goodale*.

764. SMITH, W. G. *Special strains of medicinal plants by selection*. Pharm. Jour. 104: 116-117. 1920.—The present paper is a summary of a semi-popular lecture on breeding medicinal plants. Principles and methods used in agricultural plant breeding are summarized as follows: (a) Standard species, as of *Digitalis* and *Belladonna*, are composed of many varieties which show great diversity when studied intensively; (b) internal qualities are rarely changed by cultivation, fertilization, etc.; (c) improvement within species is obtained by selecting and propagating the best individuals; (d) better results have been obtained by selection of single plants giving rise to pure lines, as for instance in the sugar beet; (e) production of new combinations by hybridization may lead to improvement in any required direction.—To illustrate these principles and methods the author mentions marked improvement and rise in price of French lavender. Strains such as *Lavendula vera fragrans* and *L. vera delphiniensis* produce the finest oil and thrive at both low and high altitudes. *L. spica*, a native of lower altitudes, yields very inferior oil, as does the hybrid, *L. vera* × *L. spica*. The superiority of English lavender is probably due to long and intensive observation and selection. The standard of yield has been greatly increased where selection of races has been practiced. An effort began in 1904 to improve Hungarian oil of peppermint, resulting in a yield of 62-71 per cent of laevocaryone in Hungarian oil of *Mentha crispa*, as compared with 35-56 per cent in American, 35-56 per cent in German, and 5-10 per cent in Russian. Hungarian oil of *M. piperita* yields 43-56 per cent free menthol and 35-65 per cent total menthol, as compared with American oil, *M. piperita* yielding 40-45 per cent free menthol and 60 per cent total menthol. *M. piperita* has been shown by CAMUS to be a hybrid between *M. viridis* and *M. aquatica*, which thus explains its wide range of variation. The variety "Red mint," cultivated in France and coming more into use, has been found to grow where true peppermint cannot grow, and in the same field for 4 or 5 years, while true peppermint can be grown but 2 years on the same ground. "Red mint" gives a high yield but the oil is of inferior quality. Possibility in improvement is indicated by the great variation in *M. piperita*.—In America, by selection, belladonna, normally yielding 0.23 per cent alkaloid, has been made to yield 0.55 per cent; strains yielding 0.43 per cent have been made to yield 0.72 per cent; and those yielding 0.62 per cent have been selected to yield 0.87 per cent. By selection, strains of *Datura* normally yielding 0.34 and 0.35 per cent of alkaloid have been improved to yield 0.53 and 0.56 per cent respectively. [See also Bot. Absts. 6, Entry 825.]—*Francena R. Meyer*.

765. SOLER, RAPHAEL ANGEL. Cultivo del tomate. [Tomato culture.] Rev. Agric. Com. y Trab. [Cuba] 2: 479-483. 4 fig. 1919.—Progress is recorded in selection, 1917-1919, from semi-wild plants, the original stock of which is supposed to have come from the Canary Islands, 1849 or 1850. There were 3 types of tomato,—plum, pear, and ribbed. From the ribbed of the 3rd crop the author selected several strains differing in smoothness of skin and size. The selection was carried out for good salad size and for condiment. A table gives data of the 3rd crop for number of fruits and total weight in the following classes: Large salad size, commercial or cooking, large pear, small pear, plum.—*E. E. Barker.*

766. TISCHLER, G. [German rev. of: HERTWIG, G., UND P. HERTWIG. Triploide Froschlarven. (Triploid frog larvae.) Arch. Mikrosk. Anat. 94: 34-54. 1920.] Zeitschr. Bot. 13: 321-322. 1921.

767. TISCHLER, G. [German rev. of: ROSENBERG, O. Weitere Untersuchungen über die Chromosomenverhältnisse in Crepis. (Further remarks on the chromosome relations in Crepis.) Svensk Bot. Tidskr. 14: 319-325. 5 fig. 1920 (see Bot. Absts. 7, Entry 236).] Zeitschr. Bot. 13: 320-321. 1921.

768. TISCHLER, G. [German rev. of: WINKLER, HANS. Verbreitung und Ursache der Parthenogenese im Pflanzen- und Tierreiche. (Distribution and cause of parthenogenesis in the plant and animal kingdoms.) 8 vo, vi + 231 p. Gustav Fischer: Jena, 1920.] Zeitschr. Bot. 13: 317-320. 1921.

769. TRELEASE, W. The survival of the unlike. Science 51: 599-605. 1920.—The species and groups of species of agaves of the different islands of the West Indies differ from one another somewhat in proportion to the depth of water between their habitats. In any 2 adjacent islands the species differ sometimes in one character and sometimes in another, though no climatic difference is evident. It is not obvious that these differences are, or were, of survival value.—*John Belling.*

770. TSCHERMAK, E. VON. Beobachtungen bei Bastardierung zwischen Kulturhafer und Wildhafer. [Observations on hybridization between cultivated oats and wild oats.] Zeitschr. Pflanzenzücht. 6: 207-209. 1918.—In hybrids between wild oats and cultivated oats it has been determined that there is absolute coupling between the wild-oat characters, (M_1) falling apart of the spikelets on ripening, that is, brittleness with breaking apart at the horse-shoe-shaped callus, and (M_2) complete beardedness. On the other hand, there is complete incompatibility of the wild-oat character, (M_3) strong hairiness of the lemmas of all flowers, and (m_4) the cultivated-oat character, yellow glume color; and also (in the observations of the author) of the wild-oat character, (M_4) brown glume color, and (m_3) the cultivated-oat character, glabrousness. Schematically represented:—

$$\begin{aligned} F_1 &= M_1 < m_1; M_2 \leq m_2; M_3 \leq m_3; M_4 > m_4 \\ F_2 &= (1) (M_1 M_2) (M_3 M_4) \\ &= (2) (M_1 M_2) (m_3 m_4) \\ &= (3) \text{ as } F_1 \\ &= (4) (m_1 m_2) (m_3 m_4) \end{aligned}$$

The following combination is lacking:

$$(m_1 m_2) (M_3 M_4)$$

These combinations are barred out:

$$(M_1 M_2) (m_3 M_4), \text{ and } (M_1 M_2) (M_3 m_4)$$

There is repulsion between groups ($m_1 m_2$) and ($M_3 M_4$), that is, a coupling of groups ($M_3 M_4$) and ($M_1 M_2$), but not vice versa. Limiting "wild-form" (wf) to the coupled character pair brittle-fully-bearded and "cultivated-form" (cf) to non-brittle-weakly-bearded, then the method of inheritance is as follows, agreeing with the barley-glume type:

P_1 cf $\times$ wf; F_1 intermediate (in general the non-brittleness of cf dominant)

F_2	wf 4	Intermediate I 9	cf 3
F_2	Constant	4 segregate, wf : I : cf = 4 : 9 : 3 2 segregate, I : wf = 3 : 1 2 segregate, I : cf = 3 : 1 1 constant	2 segregate, cf : wf = 3 : 1 1 constant

This is explained on a bi-factorial basis on presence and absence theory as "wild-form" ($ABAB$) and "cultivated-form" ($abab$), or on association-dissociation difference in relation to 3 mutually present factors, where "wild-form" is $A^A B^A C$ and "cultivated-form" is $A \downarrow B \downarrow C$.—*C. E. Leighty*.

771. VOGTHERR, KARL. Über die theoretischen Grundlagen des Variabilitäts- und Deszendenzproblems. [On the theoretical fundamentals of the problems of variation and descent.] Zeitschr. Indukt. Abstamm.- u. Vererb. 19: 39-72. 1918.—In his introduction the author claims that whereas empirically great progress has been made with experiments in which species of animals have been modified into others by changing external conditions, the theory is still backward, and the strife between the Lamarckians and Darwinists is continued with the old blunted weapons. He is greatly impressed by TOWER's classical experiments on the production of new species of potato beetles by experimental conditions and by KAMMERER's work on *Alytes*, which he thinks prove the possibility of evolution in organisms. Both in inorganic objects and in organisms atypical and typical forms can be distinguished. Typically formed natural objects do not follow external influences but internal laws. There are no completely typical natural objects. The real task of the naturalist is to find the typical among what happens.—Variation can be caused by changes in external conditions or can be also combined with a change in the internal plant. The author calls these 2 kinds of variation homotypical and heterotypical.—The causes for all variations are changes in the environment. The lines according to which the phylogenetic development will proceed are potentially determined and unchangeable.—According to Vogtherr it is illogical to demand that the changed character shall continue after the conditions which caused them have changed back to the original ones. Putting the organisms back into normal conditions is a second experiment on heredity, and a change of the characters back to normal constitutes a second, additional proof, not a refutation. There is no reason to expect that heterotypical variation will be irreversible. The author introduces a "vital force" (*Lebenskraft*). This vital force reacts upon external conditions. That part of the paper in which the author defines his standpoint as not being quite that of either DRIESCH, KANT, or SCHOPENHAUER should be read in the original.—The cause of physical things can never be psychical. It is fundamentally impossible to find a scientific explanation of the harmony which we observe in organisms, because the organizing principles are the forces of the organic nature. This harmony is not historically developed, but it has always existed and will exist eternally.—*A. L. Hagedoorn*.

772. WAARDENBURG, P. J. [Dutch rev. of: BEHR. Die Heredodegeneration der Makula. (Heredodegeneration of the macula.) Klin. Monatsbl. Augenheilk. 65: 465. 1920.] *Genetica* 3: 88-91. 1921.

773. WAARDENBURG, P. J. [Dutch rev. of: BRIGGS, H. H. Hereditary congenital ptosis with report of 64 cases conforming to the Mendelian rule of dominance. Amer. Jour. Ophthalmol. 1919: 408. 1919.] *Genetica* 3: 65-66. 1921.

774. WAARDENBURG, P. J. [Dutch rev. of: FLEISCHER, BRUNO. Über myotonische Dystrophie mit Katarakt. (Myotonic dystrophia and cataract.) Arch. Ophthalmol. 96: 91-133. 1918.] *Genetica* 3: 91-96. 1921.

775. WAARDENBURG, P. J. [Dutch rev. of: TRAQUAIR, H. M. Hereditary glioma of the retina. British Jour. Ophthalmol. Jan., 1919.] *Genetica* 3: 81. 1921.

776. WESTERBEEK VAN EERTEN, J. B. [Dutch rev. of: WESTERBEEK VAN EERTEN, J. B. *arts te Hummelo. Eugenietiek, historisch-critisch overzicht. (Eugenics, a historical critical review.)* 207 p. A. A. von Deutekom: Utrecht, 1920.] *Genetica* 3: 81-88. 1921.

777. WETTSTEIN, F. VON. Künstliche haploide Parthenogenese bei *Vaucheria* und die geschlechtliche Tendenz ihrer Keimzellen. [Artificial haploid parthenogenesis in *Vaucheria* and the sexual tendency of its germ cells.] *Ber. Deutsch. Bot. Ges.* 38: 260-266. *Fig. 1-2* 1920.—Antheridia were removed at a very early stage of development; later, when the oogonium had reached its full size and was cut off by a partition wall, but before opening, it was pricked with a fine needle or with a thin, sharp glass capillary tube. To prevent the oozing out of the cell contents, each operation was performed in a plasmolyzing solution (3 per cent KNO_3); after about 2 minutes the plant was returned to the normal nutrient solution. Of numerous oogonia of *Vaucheria hamata* (Vauch.) DC. thus treated, 3 grew out into filaments; 1 of these filaments died while still short; the other 2 were separated from the parent plant, and each developed into a plant of typical form which, like the mother plant, bore both antheridia and oogonia.—Of a considerable number of antheridia similarly wounded, 2 developed into filaments, 1 of which survived to become likewise a typical monoecious plant.—Of *V. sessilis* (Vauch.) DC., 1 oogonium was induced to regenerate, with similar results.—These experiments are considered as supporting the notion of CORRENS that both sexual potentialities are present in the cells of both monoecious and dioecious plants, whether haploid or diploid, and that the development of either sex organ results from the action of factors which inhibit the expression of the opposite potentiality, either in the plant as a whole (dioecism) or in a particular part of the plant (monoecism). In the present case, the regenerating organs contained only the sexual nuclei, which in each case, therefore, must carry both sexual potentialities.—C. E. Allen.

778. WITSCHI. [German rev. of: LEBEDINSKY, N. G. *Darwins geschlechtliche Zuchtwahl und ihre arterhaltende Bedeutung. (Darwin's sexual selection and its significance for the maintenance of species.)* Habilitationsvortrag Univ. Basel. 31 p. Helbing Lichtenhahn: Basel, 1918. IDEM. *Geschlechtsdimorphismus und Sexualelektion. (Sex dimorphism and sexual selection.)* *Verh. Naturf. Ges. Basel* 30: 1919.] *Biol. Zentralbl.* 40: 571-573. 1920.

HORTICULTURE

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(See also in this issue Entries 590, 604, 606, 625, 662, 666, 667, 729, 898, 910, 932, 948 954, 960, 1020, 1038, 1070, 1093, 1094)

FRUITS AND GENERAL HORTICULTURE

779. ANONYMOUS. Culturas intercalares entre os coqueiros. [Crops for interplanting between coconuts.] *Bol. Agric. [Nova Goa, Portuguese East India]* 1: 210-212. 1919.—Minor crops are listed which can be cultivated between the rows in coconut plantations, including those that may be grown during the first 5 years before the coconuts are in bearing and those that may be grown after that time. Sweet potatoes, coffee, millet, bananas, cassava, tomatoes, peppers, eggplants, and other vegetables are recommended. Various leguminous cover crops will also prove beneficial.—John A. Stevenson.

780. ANONYMOUS. Posição do côco-semente no solo. [Position of the seed coconut in the ground.] *Bol. Agric. [Nova Goa, Portuguese East India]* 1: 212-214. 1919.—An experiment was carried out to ascertain the proper position for planting coconuts. One lot was placed vertically with the germ end up, a 2nd lot in the reverse position, a 3rd lot horizontal with the germ end slightly depressed, a 4th lot horizontal, and a 5th lot the reverse of the 3rd. It was found that coconuts in the 3rd and 4th positions germinated best.—John A. Stevenson.

781. ANONYMOUS. *Sobre a floração da mangueiro.* [The blooming of the mango.] Bol. Agric. [Nova Goa, Portuguese East India] 1: 207-210. 1919.—The causes of non-flowering in the mango (*Mangifera indica*) are discussed, including excessive heat and humidity, insects, and overproduction the previous year. Remedies for certain of these conditions are outlined.—*John A. Stevenson.*

782. ANONYMOUS. *Two new raspberries.* Jour. Pomol. 1: 243. 2 pl. 1920.—Two promising new varieties of red raspberry are described, the Pyne's Royal and the Park Lane, both originated by Mr. Pyne of Topsham, Devon, and introduced in 1912 and 1913.—*L. H. MacDaniels.*

783. ALLEN, W. J. *Fruit trees that have been blown over.* Agric. Gaz. New South Wales 32: 292. 1921.—The article discusses the handling of such trees.—*L. R. Waldron.*

784. ANTHONY, R. D. *Has the orchard survey a place on the research program?* Proc. Amer. Soc. Hort. Sci. 17: 174-178. 1920 [1921].—This paper discusses the manner in which a pomological survey, dealing chiefly with apples, was conducted in Pennsylvania. The author concludes that, inasmuch as the survey brought the College and Station staff into close contact with actual field conditions in the state, the staff was thereby in a much better position to plan and conduct its research work so as to be of the greatest value to the state. This would not have been possible without the intimate knowledge of the problems which were brought out by the survey.—*H. W. Richey.*

785. AUCHTER, E. C. *A preliminary report on apple and pear breeding in Maryland.* Proc. Amer. Soc. Hort. Sci. 17: 19-32. 1920 [1921].—This is a preliminary report covering the investigations in apple and pear breeding during the past 15 years. The pear crosses are mainly between Keiffer and other standard varieties. In most of the apple crosses one or both parents were from early varieties. Since many of the pear and apple seedlings have not fruited, a detailed study has been made only of the results secured from the 1907 early-apple crosses. The varieties intercrossed have been chiefly Early Ripe, Yellow Transparent, Williams, Red June, Astrachan, and Early Harvest. Seeds have also been secured from these varieties when open pollinated. The results show that certain crosses set fruit better than others; that more seeds per apple were produced from some crosses; that the percentage of germination varied considerably, and that in certain crosses a greater percentage of seedlings died, whether from poor environmental conditions or weak constitutional vigor. There is a suggestion that the factor, or factors, for long length of apples is dominant over the factor, or factors, for shorter length, those for red color over those for yellow color, and those for acid or sub-acid flavor over those for mild sub-acid or sweet flavor. The fruit of seedlings has about the same ripening period as that of their parents. Of the 166 crossed seedlings, 24 appear to be promising, of the 90 seedlings produced from open pollinated fruit, only 2 are promising. Williams seems to be a good variety for early-apple breeding. Of the cross, Williams × Transparent, one seedling, ripening as early as the earliest Transparents, is very promising.—*E. C. Auchter.*

786. BALME, JUAN. *El kaki.* [The kaki] Rev. Agric. [Mexico] 5: 505-507. 3 fig. 1920.—The possibilities of the culture of the kaki, or Japanese persimmon, in Mexico are discussed. Several varieties are described.—*John A. Stevenson.*

787. BALME, JUAN. *El porvenir de las frutas tropicales. El coco y el dátil.* [The future of tropical fruits. The coconut and the date.] Rev. Agric. [Mexico] 5: 579-581. 3 fig. 1920.—The possibilities of growing the date and coconut commercially in Mexico are discussed.—*John A. Stevenson.*

788. BALME, JUAN. *La viticulture en Mexico.* [Viticulture in Mexico.] Rev. Agric. [Mexico] 5: 581-583. 2 fig. 1920.—In order to encourage the grape growing industry in Mexico, the Department of Agriculture has decided to distribute a million plants of selected varieties. For comparative purposes, statistics of the California industry are given.—*John A. Stevenson.*

789. BARKER, B. T. P., AND G. T. SPINKS. Fruit breeding investigations at Long Ashton. Jour. Pomol. 1: 224-234. 1920.—A large number of crosses were made between different varieties of apples, pears, plums, cherries, currants, gooseberries, and strawberries. The purpose of the work was to produce varieties with definite combinations of characters by using known parents, and to ascertain to what extent the offspring would resemble the different parents. Most of the tree-fruit seedlings have not yet come into bearing, so no conclusions can be drawn.—Seedlings from the seeds of the same apple in a given cross resemble each other in fruit characters more closely than those from different fruits of the same cross.—The results of raspberry breeding are unsatisfactory because nearly all the hybrids produce very few blossoms.—*L. H. MacDaniels.*

790. BARNETT, R. J. Terminology of orchard soil management methods. Proc. Amer. Soc. Hort. Sci. 17: 172-174. 1920 [1921].—The stated purpose of the article is the discussion of definitely fixing the terminology and orthography of pomological literature. For illustration, a list of terms descriptive of various orchard soil management methods with their orthography and definitions is submitted.—*H. W. Richey.*

791. BARSS, H. P. Success in spraying. Better Fruit 15³: 3-4. 1921.—Though spraying has reached its highest development in the Pacific Northwest, there are certain pertinent facts that the grower must keep in mind in order to be successful: (1) Spraying is not a cure but a prevention; (2) timeliness of application is essential; (3) the work must be thorough (iron sulphate [copperas] may be used as an indicator); (4) a particular spray must be used for a particular disease or pest; (5) spraying is cumulative in effect; (6) economy of spraying is measured not by the amount of spray saved but by the degree of prevention secured.—*A. E. Murneek.*

792. BEACH, S. A. Fruit breeding in the Northwest and its significance in horticultural development. Proc. Amer. Soc. Hort. Sci. 17: 13-19. 1920 [1921].—The author discusses fruit breeding in the upper Mississippi Valley and Great Plains regions where most of the standard fruits have failed because of inability to withstand the climatic extremes. In the more favored areas, a few standard varieties of apples and some cherries are grown, but practically no standard varieties of plums, sweet cherries, peaches, quinces, pears, and other orchard fruits.—The obstacles to success in fruit breeding are many, one of the most important being the lack of hardiness of the most desirable types. Barring the crab apple, the Hibernial and others of its type appear to be superior in hardiness. One problem is to determine to what extent hardiness in the apple and crab apple can be segregated and recombined with other desirable characters, and what varieties can best be depended upon as parents to transmit these characters. Late-keeping winter apples must be developed for the region. There are several good summer and early autumn varieties which are either crab hybrids or of the Russian group. It is thought that in time many hardy varieties will be developed for this region, and that there is a great future for both amateur and commercial fruit growing in the section.—*E. C. Auchter.*

793. BEEKHUIS, H. A. Handling the peach crop. Associated Grower 1⁶: 7, 42. 1920.—Well matured, uninjured, and properly treated peaches yield the best dried product.—*E. L. Overholser.*

794. BONCQUET, P. A. The dieback of Emperor grapes. Associated Grower 1⁷: 9, 42, 43, 48. 1920.—Occasionally vines remain dormant, not growing in the spring. If they do develop, their growth remains incomplete and the leaves undersized. This behavior is attributed to lack of carbohydrate supply.—*E. L. Overholser.*

795. BONNET, L. O. The Dizmar grape. Associated Grower 1⁸: 24-25, 42. 1920.—The berry is large, almost ellipsoidal in shape, has neutral flavor, thin skin, and crisp texture. The bunch is large, ovoid elongated, and loose, and the vine is vigorous with long spreading canes. It is a good shipping grape, grows well on soils adapted to the Muscat, and will bear profitable crops if pruned long.—*E. L. Overholser.*

796. BRADY, J. Protecting orchards from frost with smudge-pots. *Agric. Gaz. New South Wales* 32: 256. 1921.—The article briefly describes the method used in California.—*L. R. Waldron.*

797. BROWN, G. G. Fertilizer for orchard and bush fruits. *Better Fruit* 15³: 3, 23-25. 1921.—The writer recommends the following fertilizing program based on observations and experiments performed at the Hood River Branch Experiment Station: No fertilizer should be used for young trees if the ground is clean cultivated and new growth is ample; otherwise $\frac{1}{2}$ -1 lb. of nitrate of soda per tree. When trees are commencing to bear, but show poor vegetative growth, 2 pounds of nitrate per tree may be advisable. In old orchards nitrate of soda may be of great value, excepting where alfalfa or clover is grown and plowed in; the latter will furnish enough nitrogen to supply the needs of the tree. When alfalfa has "run out," clean cultivation may be practiced for 1 or 2 years followed by new seeding of alfalfa. A small amount of nitrate of soda may be added to advantage during the 1st year after seeding to alfalfa or clover.—For strawberries the writer recommends a complete fertilizer made up as follows: Nitrate of soda 800 lbs., superphosphate 800 lbs., beet char 400 lbs.—*A. E. Murneek.*

798. BROWN, W. S. The December freeze—some lessons from it. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 9-14. *Fig. 1-4.* 1921.—This article consists of notes indicating the relative behavior and resistance of varieties of fruit trees to winter freezes, some methods of treatment of winter-injured trees, and cultural advice on possible means of preventing such injury.—*E. J. Kraus.*

799. BUNYARD, EDWARD A. The history of paradise stocks. *Jour. Pomol.* 1: 166-176. 1920.—This is an endeavor to straighten out the confused botanical relationships of the different types of paradise stocks. The history of the various types is traced from the time of Theophrastus.—*L. H. MacDaniels.*

800. CHOMLEY, F. G., AND J. ARTHUR. Some experiences with fruit under irrigation. *Agric. Gaz. New South Wales* 32: 273-276. 1921.—Methods of irrigation and culture are given; also notes on varieties, and spraying to combat disease.—*L. R. Waldron.*

801. COIT, J. E. Mechanical theory of splitting figs. *Associated Grower* 1³: 30-31. 1920.—Transpiration is suddenly stopped by a drop in temperature and the roots continue to supply water to the figs, bursting them. If this hypothesis is correct the best general prevention would be the application of uniform moisture. Fermentation is caused by infection with yeasts. If the fig is well sugared, yeast will do no harm. Fermentation by yeasts invites other destructive fungi, such as blue molds, black smut, and dry rot.—*E. L. Overholser.*

802. CONDIT, I. J. California fig soil and fertilizers. *Associated Grower* 1⁴: 18-19. 1920.—Although very resistant to alkali, it is inadvisable to plant figs on soil containing more than 0.03 per cent total salt. A high water table acts detrimentally on the fig crop, reduces leaf surface, and retards the normal activities of the tree.—*E. L. Overholser.*

803. CONDIT, I. J. Getting the people acquainted with the great American fig. *Associated Grower* 1³: 18, 35. 1920.—The Kadota fig tree is resistant to unfavorable moisture conditions, and a rank grower when given an abundant water supply. The 1st crop consists of much larger sized fruit than the 2nd, the latter, however, being much better for preserving and canning purposes. Caprification affects the fruit of the Kadota more noticeably than it does most other common figs. The value of caprification depends upon ultimate use to which the fruit is to be put; thus, caprifigged figs though better for drying are not so desirable for canning. Being very adaptable to soil and climate conditions, the Kadota is propagated over a wide range of territory.—*E. L. Overholser.*

804. CONDIT, I. J. Points on practical culture of figs. *Associated Grower* 1²: 9, 46. 1920.—Caprification is now recognized as a necessity in the production of Smyrna figs. Three capri fig trees must be planted for every 100 Calimyrna trees. The female *Blastophaga* can

enter when the figs are less than $\frac{3}{4}$ inch in diameter; the flowers of such figs are presumably receptive to pollen. From that stage until the figs reach about 1 inch in diameter they may be entered by insects and caprifigged. Capri figs are ready to pick as soon as the male insects issue freely from the gall flowers. The most popular varieties of caprifigs are Stanford and Roeding No. 3.—*E. L. Overholser*.

805. CONDIT, I. J. Summer pruning of the fig. *Associated Grower* 14: 28-30. 1920.—Certain varieties, like the Mission and Adriatic, respond profitably to early summer pruning. Summer pruning not only favors a desirable crop but also accentuates the growth of the main framework of the tree; thus the amount of succulent growth is greatly reduced and better protection is afforded against winter frosts.—*E. L. Overholser*.

806. CRADWICK, W. Cocoa. *Jour. Jamaica Agric. Soc.* 25: 52-57. 1921.—The author presents a discussion of cacao growing under Jamaican conditions, including cultural directions, shading, pruning, and the proper time for picking.—*John A. Stevenson*.

807. CRANDALL, C. S. An experience in self-fertilization of the peach. *Proc. Amer. Soc. Hort. Sci.* 17: 33-37. 1920 [1921].—Investigations were made concerning the self-fertility of seedling peach trees of known parentage, some of which were grown in the orchard and others in the greenhouse under more or less controlled conditions. Some buds were emasculated and hand pollinated while others were covered without emasculation or hand pollination. By the former method, as practiced in the orchard, 6.38 flowers were required to produce one seedling tree; by the latter, 20.5 to produce one seedling tree growing in the orchard. This reduced number was due to lack of fertilization, undeveloped embryos, and poor germination of seed. The work done under glass was less successful from the standpoint of surviving seedlings since each required the pollination of 7.24 flowers. It is probable that this difference is due to deficient nutrition of the trees grown in tubs.—*E. C. Auchter*.

808. CRANE, M. B. The raising of fruit trees from seed. *Jour. Pomol.* 1: 210-216. 2 fig. 1920.—An account is presented of the methods used in raising fruit-tree seedlings at the John Innes Horticultural Institution, Merton, England. Seeds of stone fruits are removed from fruits and stratified at once in sterilized sand or soil. They are kept all winter in a moist condition in cold frames with full exposure to frost. Early the following year the seeds are removed from the shells and planted in boxes in a cool greenhouse.—Apple seeds are removed from the fruits in the fall and sown directly in the germination flats in cold frames. When germination starts, the flats are taken into the cool greenhouse.—Plum and apple seeds kept dry till late in the winter will not germinate until the following year. Seedlings usually fruited the 6th year from seed. Buds from 2-year old seedlings budded on other stock flowered in 6 years from bud (8 years in all).—*L. H. MacDaniels*.

809. CRUESS, W. V. Rain damage insurance. *Associated Grower* 17: 3, 19, 36. 1920.—For obtaining a high yield of superior evaporated grapes the writer emphasizes the importance of using well ripened fruit. The installation and use of evaporators is considered an economy. [For details see *Bot. Absts.* 6, Entry 1176.]—*E. L. Overholser*.

810. DURHAM, HERBERT E. The recognition of fruit. II. Some systems concerning apples and pears. *Jour. Pomol.* 1: 177-187. 1920.—To date no very satisfactory classification of varieties of apples and pears has been made by which the varietal name of an unknown specimen can be determined. It is in fact doubtful if any such classification can be made on account of the great variation within a variety. A number of such classifications have been proposed; several of these are outlined briefly while that of TRUELLE is given at length.—*L. H. MacDaniels*.

811. FAIRCHILD, DAVID. La papaya injer tada como arbol frutal anual. [The grafted papaya as an annual fruit tree.] *Rev. Agric. [Mexico]* 5: 433-437. 3 fig. 1920.—The possibilities of the grafted papaya (*Carica papaya*) as an annual fruit crop are discussed. Directions for making the grafts and general cultural directions are given.—*John A. Stevenson*.

812. FANTINI, N. Varios sistemas de poda. [Pruning systems.] *Defensa Agric. [Uruguay]* 2: 11-16. 13 fig. 1921.—Popular.—*John A. Stevenson.*

813. HARTMAN, H. Depth of planting in relation to tree growth. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 47-48. 11 fig. 1921.—Young trees of Esopus and Graevenstein apples, d'Anjou pears, and Italian prunes were set at varying depths, ranging from that at which the tree grew in the nursery to 27 inches below that depth. After 4 years there were no striking differences in size and vigor of tops or diameter of trunks. In all cases of deep planting the tendency of growth of the original roots was toward the surface of the soil. The pear trees developed no roots above the graft, the apple trees developed a few though they were of no real importance, whereas the prune trees developed many, but they did not correspond in amount to the development of the tops of the trees.—*E. J. Kraus.*

814. HARVEY, E. M. Summer pruning of young apple trees. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 20-26. Pl. 1-2. 1921.—From experiments designed to test the effect of various combinations of winter and summer pruning and involving 1100 young Rome and Gano apple trees, it appeared that all types of summer pruning allowed less tree growth than winter pruning only; fruit-spur formation was not increased, and the amount of fruit harvested in the case of summer-pruned trees was less than that from those winter-pruned only. Summer-pruning practices must be regulated in accordance with varietal behavior.—*E. J. Kraus.*

815. HARVEY, E. M., AND A. E. MURNEEK. Some relations of growth and bearing of fruit trees to orchard practices. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 15-19. Fig. 5. 1921.—Undeveloped spurs of apple trees were able to form abundant fruit buds and to set a good crop of fruit, while the reverse was true for defoliated spurs. The latter contained relatively more nitrogen and less carbohydrate than the undeveloped spurs. Certain effects of some orchard practices are analyzed on the basis of how they may affect the carbohydrate-nitrogen relationships in the trees.—*E. J. Kraus.*

816. HEDRICK, U. P. Pedigreed nursery stock. *Jour. Pomol.* 1: 155-160. 1920.—Experience at the New York State Experiment Station and extensive reference to the horticultural literature lead to the conclusion that varieties of fruits have not been, and cannot be, improved by bud selection. It is nurture, not nature, that produces the variation in varieties. The present practices in the propagation of fruit trees are justified by the precedents of centuries. The practical difficulties in growing trees from selected buds are almost insuperable, and the burden of proof is upon those who advocate growing pedigreed trees. The author is dealing entirely with deciduous fruits.—*L. H. MacDaniels.*

817. HODSOLL, H. E. P. Manuring fruit trees for continuous crop production. *Jour. Pomol.* 1: 217-223. 1920.—After 4 years' experience with different varieties of apples and other fruit, the writer concludes that it is entirely practicable to produce heavy crops each year by proper use of manures. A "special soluble organic manure" applied in August assures abundant flower-bud formation. This is followed in the winter by a dressing of "lasting organic manure" such as hoof meal, meat and bone meal, or similar materials. This insures sufficient vigor in the tree to support the blossoms and hold the crop. Fruitfulness results when the proportion of elaborated food to mineral nutrients is high. The reverse condition causes vegetative growth only. No data are given.—*L. H. MacDaniels.*

818. HOPPERT, E. H. Extension work in fruit growing in Nebraska. *Proc. Amer. Soc. Hort. Sci.* 17: 91-94. 1920 [1921].—The article deals with the extension work in home apple orcharding in Nebraska. The chief problems considered are proper care of bearing orchards and the correct planting and caring for new home orchards. In the extension work, pruning and spraying demonstrations are given, demonstration orchards are selected, meetings are held, timely articles are written, and exhibits are held at the various county fairs.—*H. W. Richey.*

819. HOWARD, F. K. Training young vines. Associated Grower 1²: 10. 1920.—The single trunk system of training and forming a comparatively high head gives the best results over a long period of years. Permanent stakes are placed at planting time, and, when sufficient growth develops, the strongest and best shoot is tied to the stake. All others are removed except one,—to be used in case of damage to the main branch.—*E. L. Overholser.*

820. KELLEY, W. P. Present status of alkali. Associated Grower 1⁸: 11–12, 38. 1920.—Citrus trees and walnuts are especially sensitive to soil salinity. Water rich in salts and a high irrigation water table are the chief factors causing soil alkalinity. The spread of alkali by the latter method may be avoided by (1) lining or cementing the canals at the outset, and (2) by using better methods of distributing the water, especially by applying less water at a time. Drainage, especially if it be accompanied by flooding, is a reasonably successful means of removing white alkali from soil. Leaching the excess of salts out of the soil and at the same time maintaining chemical and physical conditions favorable to crop growth remains a problem.—*E. L. Overholser.*

821. MELANDER, A. L. The relation of beekeeping to fruit growing. Amer. Bee Jour. 61: 138–139. 1921.—A popular discussion of the advantages of the cross-pollination of fruit trees. For this purpose no insect is so valuable as the honeybee. Many orchardmen pay \$5 per colony for the use of bees during the blooming period of fruit trees.—*J. H. Lovell.*

822. MURNEEK, A. E. "Pedigreed" trees—where do we stand? Better Fruit 15⁸: 13–15. 15⁹: 6–8. 1921.—Since bud selection for propagating purposes has become of great economic importance with citrus fruits in California, the writer raises the question of its value and practicability with deciduous trees in the Pacific Northwest. Reviewing the work of several experiment stations where bud selection experiments have given negative results, the author concludes that selected or "pedigreed" stocks of deciduous trees are no better than ordinary trees—at least in the light of our present knowledge.—*A. E. Murneek.*

823. MURNEEK, A. E. Stock influence on scion—in regard to top grafting. Better Fruit 15⁷: 3–4, 34–36. 1921.—There are many ways in which the scion may be modified by the stock. The following have been considered in detail: (1) Form and size of the plant, (2) vigor of growth, (3) health, (4) hardiness, (5) productivity and precocity, (6) time of blossoming and maturing of fruit, and (7) longevity. The indirect influence of the stock on the scion, as expressed in changes of character of the fruit, may be as follows: (1) Modification of color, (2) change in size, and (3) changes in eating and keeping quality.—*A. E. Murneek.*

824. MURNEEK, A. E. The storage of Bose pears. Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 27–32. Fig. 6–7. 1921.—Time of picking does not materially influence storage quality, except that fruit picked very early must be partially ripened under more humid conditions and for a longer period than fruit picked later. Fruit may be kept for 3 months or longer by the following storage procedure: Delay 10 to 15 days, car temperature 12 to 15 days, then cold storage. Delayed fruit should be held at 60–70 per cent humidity. Both relatively high temperature with low humidity and low temperature with high humidity are harmful to proper ripening.—*E. J. Kraus.*

825. NICHOLS, H. E. New interest in Iowa home orchards. Proc. Amer. Soc. Hort. Sci. 17: 87–91. 1920 [1921].—The article discusses the manner in which spraying demonstrations for the home orchard have developed during the past 10 years. It explains the organization and states the success of spray rings under the direction of the County Agent and the Extension Horticulturist with the cooperation of the Iowa Fruit Growers' Association. Figures are given showing the growth of the movement, the average cost of spraying, and the returns.—*H. W. Richey.*

826. OVERHOLSER, E. L. Fruit exhibits and fruit judging. Associated Grower 1⁹: 28–30. 1920.—Emphasis is laid on condition, uniformity, color, size, and form,—the 5 main

factors in determining the standard of exhibition fruit. Other necessary details to be borne in mind by the farmer in selecting and exhibiting products, so as to obtain the most satisfactory results, are outlined.—*F. deVilliers*.

827. OVERHOLSER, E. L. The nectarine belongs to the peach family. *Associated Grower* 1⁰: 27, 35. 1920.

828. ROBERTS, R. H. Studies in biennial fruiting. *Jour. Pomol.* 1: 197-202. 1920.—Extracts reprinted verbatim from *Proc. Amer. Pomol. Soc.* 1917: 28-33. 1918 (see *Bot. Absts.* 7, Entry 999).—*L. H. MacDaniels*.

829. SCHMIDT, R. Care of old grafted trees and vines. *Associated Grower* 1⁴: 7, 44. 1920.

830. SCHMIDT, R. How to wire limbs bent by fruit. *Associated Grower* 1⁷: 7. 1920.

831. SCHMIDT, R. Summer pruning in raisin vineyards. *Associated Grower* 1²: 10. 1920.—As the plant requires an abundance of leaf surface to make a satisfactory growth, summer pruning should be mild. However, some pruning during the growing season is beneficial especially in 1- and 2-year old plants.—*E. L. Overholser*.

832. SCHUSTER, C. E. Cherry breeding. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 42-43. 1921.—Seedlings of the Bing, Lambert, and Napoleon varieties have proved self sterile but set good crops when open to insect pollination. Resistance to gummosis is variable. A large number produce fruit of excellent quality. The season of maturity is variable, as is also the texture of the flesh; some are suitable for fresh shipment, others for canning.—*E. J. Kraus*.

833. SCHUSTER, C. E. Pollination of the Ettersburg No. 121 strawberry. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 44-46. *Fig. 9-10.* 1921.—The fruit of this variety is very solid, borne on stiff upright stalks, and suitable for canning. All evidence indicates that it is self-fertile and cross pollination does not increase the yield. About 13 per cent of the secondary blossoms mature into fruits, whereas practically all of the primary blossoms mature. Since each plant produces a total of 150-600 blossoms, and of these from 50-54 per cent are considered as primary, normally as many fruits are set as can be matured to good size.—*E. J. Kraus*.

834. SMART, W. A. Control of moss and lichens in the orchard. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 172-173. *Fig. 49.* 1921.—A late fall or winter spray of Bordeaux mixture, 6-6-50, or of lime-sulphur, 1-8, sufficient to saturate the growths will destroy moss and lichens.—*E. J. Kraus*.

835. SNYDER, E. A year's work with Zante currants. *Associated Grower* 1⁷: 26-27. 1920.—Panariti is the main variety of "currants" grown. Ringing has been demonstrated to be a good, as well as a necessary, practice. For drying, the fruit should be fully mature.—*E. L. Overholser*.

836. SNYDER, E. Grafting over old vines. *Associated Grower* 1⁴: 5, 43. 1920.

837. SNYDER, E. Timely hints on ringing the Panariti. *Associated Grower* 1²: 6. 1920.—Ringing is best practiced during the blooming period. Preferably each cane should be ringed separately, making 2 cuts $\frac{1}{8}$ — $\frac{1}{4}$ inch apart as close to the base of the cane as possible, and completely removing the bark between the incisions. The resulting clusters are heavier, more compact, and more uniform.—*E. L. Overholser*.

838. TAYLOR, R. H. Next year's peach crop depends on care of trees. *Associated Grower* 1⁴: 5-6. 1920.

839. THOMAS, OWEN. Forgotten or discarded grapes. Jour. Pomol. 1: 161-165. 1920.-The author discusses the quality and characters of a number of varieties of grapes, especially those grown in England about 1860.—*L. H. MacDaniels*.

840. WELLINGTON, RICHARD. Grape varieties that produce seedlings of superior merit. Proc. Amer. Soc. Hort. Sci. 17: 37-40. 1920 [1921].—The report deals with about 11,000 grape seedlings grown at the New York Agricultural Experiment Station, and obtained from 37 variety crosses, 38 varieties by seedling crosses, 9 seedling crosses, 163 variety self-fertilizations, 50 seedling self-fertilizations, and a few species crosses. The number of plants in each cross or self-fertilization varied from 1 to over 500.—The author concludes that only 1 individual out of each 1000 will be worthy of perpetuating. The crosses gave proportionately more desirable seedlings than the selfed varieties. Most of the varieties used proved to be poor parents but a few produced a remarkably large number of excellent seedlings. A table is included of the variety crosses and selfed varieties, showing the percentage and number of vines set and number and per cent selected for propagation. The most desirable crosses are Governor Ross $\times$ Mills, Mills $\times$ (Winchess $\times$ Diamond), Triumph $\times$ Mills, and Winchell $\times$ Diamond. Mills has been the leading grape for producing high quality. Diamond produced good quality and Winchell proved of exceptional value in introducing earliness without impairing quality. The author concludes that to produce desirable seedling grapes. *Vitis vinifera* species or derivatives of this species must be depended on for quality and *V. labrusca*, *V. vulpina*, and other American species for hardiness. More certain results will be obtained by crossing rather than selfing and in using varieties that are known to produce superior progeny.—*H. W. Ritchey*.

841. WHITTEN, J. C. Thinning peaches makes better fruit. Associated Grower 13: 4. 1920.

842. WILCOX, L. P. Fertilizer experiments with fruits. Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 49-51. 1921.—Applications of $3\frac{1}{2}$ -5 lbs. of nitrate of soda to the soil under each of a number of old Italian prune trees 1 month before blooming resulted in increased growth and increased number and size of fruits. The time required to dry the fruit was not increased. Applications of the same material at the rate of 250 lbs. per acre to red raspberries at the time the new canes were about 3 inches tall resulted in more and larger canes per plant, and an increased yield of fruits of larger size and better color. There was severe killing of the new canes, which continued to grow into the fall and winter.—*E. J. Kraus*.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

843. AUST, F. A. A state program for landscape extension. Proc. Amer. Soc. Hort. Sci. 17: 54-60. 1920 [1921].—The relation of landscape extension to the sciences is briefly touched upon. Man's need for natural beauty, and the usefulness and beauty of his natural surroundings are discussed. Landscape extension is defined as "The development of the appreciation and the furthering of the practice of the fundamental principles of the art of landscape design, by the citizens of every community." The designer must study the life about him in order to interpret it to the community which he serves. His duty is to teach the public the best in landscape art and to demonstrate the value of professional assistance. "The main function of landscape extension is education." The leaders must cooperate with existing organizations and agencies in order to avoid duplication of effort. The extension program should include: (1) Research in landscape problems, (2) demonstration, (3) lecture work, (4) publication, (5) follow-up work. Types of demonstrational work found effective in Wisconsin are listed and the paper closes with a discussion of the state extension program.—*W. R. Ballard*.

844. BALME, JUAN. Lirio del valle o muguet. [Lily of the valley.] Rev. Agric. [Mexico] 5: 430-432. 4 fig. 1920.—A popular account of the methods used in growing the lily of the valley in the U. S. A. and Europe.—*John A. Stevenson*.

845. DOMINGUEZ, IGNACIO. *El cultivo de las plantas florales ornamentales.* [Cultivation of ornamentals.] *Rev. Agric. [Mexico]* 4: 434-437. 1919.

846. McCALL, F. E. *Farmstead planting.* *Proc. Amer. Soc. Hort. Sci.* 17: 64-69. 1920 [1921].—The author asserts that the field service of the agricultural colleges can as well be directed toward making country life more beautiful and enjoyable as toward making farming more profitable. Pleasant home surroundings have real value in the development of contented patriotic citizens.—The prairie sections require treatment adapted to the unusual conditions. In South Dakota the aim of the extension workers has been to combine beauty with utility and convenience. The Northern Great Plains have limitations in plant growth which must be recognized. In the planting of trees and shrubs 3 points should be observed as follows: (1) Thorough preparation of the soil, (2) the proper choice of plant materials, and (3) cultivation until plants are well established. General garden literature does not furnish reliable information for the prairie worker. Farmstead planning as practiced in South Dakota includes all those features which contribute to outward convenience and ornamentation. Suggestions under the heads of (1) the farmstead in general, (2) the house, and (3) out-buildings and lots, are given as to special features which should be considered in farmstead planning.—Suggestions are also given for the planting and care of trees and shrubs and a list of ornamentals for South Dakota conditions is appended.—*W. R. Ballard.*

847. WAUGH, F. A. *Extension work in landscape gardening.* *Proc. Amer. Soc. Hort. Sci.* 17: 60-64. 1920 [1921].—The distinction is made between the practical art of growing plants and the art of landscape design. The extension worker in landscape gardening should have in mind as his objectives: (1) The inculcation of a love and reverence for the native landscape, (2) the securing of public reservations of various forms, (3) the extension of the knowledge of landscape gardening, (4) the promotion of the development of better farm-home surroundings, (5) the promotion of similar development in towns and cities, (6) the promotion of the development of community equipment, the last being considered the most important field. The farm home furnishes the best point of first attack. The rural school grounds, country playgrounds, country roads, country parks and picnic grounds, state parks and similar large projects, grounds of public institutions and public cemeteries are all legitimate fields of operation. Four principal methods of work are suggested, as follows: (1) Practical or inspirational lectures, (2) publications, (3) organization of clubs and competitions, and (4) professional assistance. The 4th method is the most effective but should be accompanied by the other 3.—*W. R. Ballard.*

848. WILSON, E. H. *The "Indian Azaleas" at Magnolia Gardens.* *Jour. Arnold Arboretum* 2: 159-160. 1921.—Mention is made of the most interesting and important species and forms of the collection of Indian Azaleas at Magnolia Gardens, established about 1850 near Charleston, South Carolina.—*Alfred Rehder.*

849. YEAGER, A. F. *Shelterbelts for North Dakota.* *North Dakota Agric. Exp. Sta. Ext. Div. Circ.* 43. 7 p., 8 fig. 1921.—The circular contains a list of the best varieties of trees and shrubs and gives methods of planting and care.—*L. R. Waldron.*

VEGETABLE CULTURE

850. BALME, JUAN. *La alcachofa.* [The artichoke.] *Rev. Agric. [Mexico]* 4: 517. 1919.—The author gives brief cultural directions for the globe artichoke (*Cynara scolymus*).—*John A. Stevenson.*

851. BOUQUET, A. G. B. *Factors affecting production and marketing of broccoli.* *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 36-39. *Fig. 8.* 1921.—There is a marked variation in strains, some including cabbage and kale crosses. Greater care in seed production is urged.—*E. J. Kraus.*

852. BOUQUET, A. G. B. Factors affecting shrinkage and condition of broccoli. Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 40-41. 1921.—The shrinkage of heads is very much greater if the latter are cut at any time after prime condition. It is preferable even to cut the heads immature rather than when they show signs of curd separation.—*E. J. Kraus.*

853. BOUQUET, A. G. B. Vegetable greenhouse crops in relation to the use of the greenhouse for one season. Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 33-35. 1921.—The author gives suggestions on crops which can be produced in the autumn.—*E. J. Kraus.*

854. PITT, J. M. Farmers' experiment plots. Onion trials on the Manning river. 1920-21. Agric. Gaz. New South Wales 32: 261-264. 2 fig. 1921.—The total onion acreage for New South Wales for 1919 was only 335. Yields ran from 2.5 to 4.5 tons per acre. The crop is marketed from November to May and the price secured approximates \$300 per acre. Seedlings were transplanted into the field in July (winter) and the harvest ran from November to January. Most varieties responded very favorably to irrigation. The maximum yield was secured from White Early Barletta, which gave 7.6 tons per acre.—*L. R. Waldron.*

HORTICULTURE-PRODUCTS

855. CHRISTIE, A. W. Dried, evaporated or dehydrated? Associated Grower 1³: 20, 21. 1920.—The term "dried" is applied to all fruits and vegetables preserved by the removal of moisture, irrespective of the method of removal. To the class dried by artificial heat, the names "evaporated" and "dehydrated" are applied, as distinct from "sun-dried."—*E. L. Overholser.*

856. CRUESS, W. V., AND A. W. CHRISTIE. Revised specifications of University Farm evaporator. Associated Grower 1⁵: 8, 40, 41. 1920.

857. GAJÓN, CARLOS. Las rosas para perfumeria.—Su historia. [History of rose growing for perfume] Rev. Agric. [Mexico] 5: 351-358. 13 fig. 1919.—A popular account of the growing of roses for perfume as it is carried on in Spain, Bulgaria, Algeria, India, and France.—*John A. Stevenson.*

858. GIFFEN, W. M. Analysis of federal findings in the raisin situation. Associated Grower 1⁷: 4-5, 46. 1920.

859. JURITZ, CHAS. F. Apricot kernel oil and its congeners. South African Jour. Indust. 3: 1052-1057. 1920.—Descriptions are given of the oils obtained from almond, apricot, and peach pits, with a table showing the composition of apricot-kernel oil as well as the following constants: Specific gravity, saponification value, acid value, refractive index at 40°C., and iodine value.—*A. J. Pieters.*

860. LEGRAND, J. F. El achiote. [Annatto (*Bixa orellana*).] Rev. Agric. [Mexico] 5: 441-442. 1 fig. 1920.—Reprinted from Rev. Agric. Puerto Rico.—*John A. Stevenson.*

861. SCHMIDT, R. Handling the peach crop. Associated Grower 1⁶: 7, 43. 1920.—Trees should not be shaken to obtain peaches for drying. Many of the peaches thus collected are relatively green, have a low sugar content, and yield a poor product; they also lose 10 per cent more in weight than an equal weight of mature peaches.—*E. L. Overholser.*

862. SCHMIDT, R. Sugar content testing for raisins. Associated Grower 1⁶: 9, 44. 1920.—The author recommends the saccharometer as the most convenient instrument for sugar content determinations. The results are sufficiently accurate for ordinary practical purposes provided the necessary temperature corrections are made.—*E. L. Overholser.*

863. WIEGAND, E. H. Some investigations on prune drying. Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 52-57. Fig. 12-15. 1921.—Drying is hastened by dipping the fruit in boiling water or lye solution. A high humidity of the drying air has a tendency to open the pores of the skin and prevent charring. High humidity accompanied by rapid air movement increased the rate of drying, slow movement decreased the rate.—*E. J. Kraus.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 639, 730, 755, 892, 916, 984, 1077)

864. ANONYMOUS. [National Herbarium, Sydney, exhibit.] Proc. Linn. Soc. New South Wales 44: 820-821. 1919 [1920].—Note on the exhibit of specimens from the National Herbarium, Sydney, and elsewhere, showing synanthly and syncarpy.—*Eloise Gerry*.

865. ANONYMOUS. [Rev. of: ARBER, AGNES. The leaves of the irids and the phyllode theory. (Paper read before Sect. K of the British Assoc. Adv. Sci., August, 1920.)] Jour. Indian Bot. 2: 58-59. 1921.

866. DUNN, GRACE A. Note on the histology of grain roots. Amer. Jour. Bot. 8: 207-211. Fig. 4. 1921.—Characteristic openings were observed in the root cortex of *Zea mays* and *Triticum vulgare* when grown in water culture. In wheat these openings always appeared whether the culture solution was well or poorly balanced and under a wide range of temperatures. Wheat roots grown in sand or soil, however, showed no such openings. In corn, similar results were obtained in the winter, but in summer, when the temperature was high and growth rapid, fast-growing roots in sand and in soil also showed large openings. It is suggested that the openings appear when the oxygen supply is deficient, as it is likely to be in water culture and in all cases where growth is very vigorous and rapid.—*E. W. Sinnott*.

867. FRITSCH, KARL. Über den Begriff der Anisokotylie. [On the concept of anisocotily.] Ber. Deutsch. Bot. Ges. 38: 69-73. 1920.—The term anisocotily was proposed by the author in 1904 for the characteristic behavior of the cotyledons of seedlings of certain members of the Gesneriaceae, particularly of the genus *Streptocarpus*. In these plants, and according to the author in none of the plants of other families in connection with which the term has since been used, 1 of the 2 cotyledons, which are approximately equal in size in the seed, develops into a foliage leaf while the other stops growing very soon after germination. He believes that in other cases where the term has been used in reference to unequal size of the cotyledons this inequality exists in the embryo before germination and is due to the cotyledons being bent in the seed or otherwise arranged so that the development of one is mechanically hindered. This condition exists in species of *Gnetum*; in certain genera of the Cruciferae, Moraceae, Phytolaccaceae, Nyctaginaceae, Cappariaceae, Malpighiaceae, Dipterocarpaceae, Cactaceae, and Melastomaceae; and in some species of *Thunbergia* and *Coreopsis*. Cases such as that of *Ranunculus ficaria*, where a single cotyledon is formed by the growing together of 2, have nothing to do with anisocotily. He reiterates, on the basis of observations of J. BRUNNTHALER in South Africa, his formerly expressed belief that true anisocotily, as found there in species of *Streptocarpus*, is connected with the habit which these plants have of growing upon precipitous slopes.—*R. M. Holman*.

868. McDougall, W. B. Thick-walled root hairs of *Gleditsia* and related genera. Amer. Jour. Bot. 8: 171-175. Fig. 3. 1921.—Root hairs of *Gleditsia triacanthos* become thick-walled and brown within a few days after they are produced. They persist as long as does the root epidermis. These root hairs are regarded by the author as xerophytic structures, persisting from a time when the species grew under xerophytic conditions. Trees with these root hairs have neither bacterial nodules nor mycorrhiza. *Gymnocladus* and *Cercis* sometimes have thick-walled brown root-hairs, but not as characteristically as does *Gleditsia*.—*E. W. Sinnott*.

869. McNair, James B. The morphology and anatomy of *Rhus diversiloba*. Amer. Jour. Bot. 8: 179-191. Pl. 2. 1921.—The morphology and anatomy of the leaf, stem, root, and flower of this species are described in detail.—*E. W. Sinnott*.

870. MEYER, FRITZ JÜRGEN. *Das Leitungssystem von Equisetum arvense*. [The conducting system of *Equisetum arvense*.] *Jahrb. Wiss. Bot.* 59: 263-286. *Fig. 1-7.* 1919.—The author describes the structure and arrangement of all the elements at the node of the aerial sterile stem, the relative positions of protoxylem and metaxylem strands and of the phloem as they pass through the nodal wood; the method of insertion of the leaf and branch traces; the relative positions of the carinal holes in successive internodes and the arrangement of the conducting bundles to conform to these; the path of the conducting system through the nodes and internodes of the rhizome, tuber, leaf of the rhizome, secondary roots, branch roots, sterile stem and its branches and leaves, and the fertile stem and its leaves and cone; the connection between the parts of the system in passing from one organ to another, and the size of the xylem strands both in micromillimeters and in number of tracheids. He discusses the variations in bundle size in different regions of the plant; and the function, size, and formation of the carinal hole.—*J. P. Poole*.

871. MÖBIUS, M. *Die Entstehung der schwarzen Färbung bei den Pflanzen*. [The origin of black coloration in plants.] *Ber. Deutsch. Bot. Ges.* 38: 252-260. 1920.—The author calls attention to the fact that black coloration in plants is generally not the result of the presence of a truly black pigment but of blue, red, or brown colored substances which, as well as certain histological factors, may produce the same optical effect as would a black pigment. He then presents a classification of the causes of black coloration. Under each of the many headings and subheadings notes are given, and plants are named which illustrate the particular sort of coloration under discussion.—*R. M. Holman*.

872. NEGER, F. W., UND TH. KUPKA. *Beiträge zur Kenntnis des Baues und der Wirkungsweise der Lentizellen. I.* [Contributions to a knowledge of the structure of lenticels and of the manner in which they function.] *Ber. Deutsch. Bot. Ges.* 38: 141-149. *Fig. 1-6.* 1920.—This paper is concerned with the lenticels of conifers, particularly *Larix*, *Pseudolarix*, *Cedrus*, and *Chamaecyparis*. The tissues which may be found in lenticels of conifers are classified by the authors as: (1) "Choriphelloid," making up the greater part of the lenticels and loose in texture with large intercellular spaces; (2) "Porenkork," strips consisting of a few layers of compact brownish cells generally containing small crystals and with very short radial diameter; (3) "Sklerophelloid," lens-shaped groups of compact cells with strongly thickened walls; and (4) fragments of the primary cortex. A key to the commoner species of *Larix* is given, based on the anatomy of the lenticels, and also a similar key by which *Cedrus Libani*, *C. atlantica*, and *C. Deodara* may be distinguished. Of the 5 species of *Chamaecyparis*, *C. pisifera* alone lacks lenticels. The other species of the genus, as well as *Thuja* and *Juniperus*, and presumably most other Cupressineae, have lenticels of a new type. The center of the lenticel in these forms consists of a large mass of compact "Porenkork," the cells of which are filled with dark brown contents. Exposure of stems to dilute ammonia gas and subsequent examination of the cortical tissue underneath the lenticel for evidence of injury to the living tissue shows that the central mass of "Porenkork" is impermeable to the gas, which, however, finds easy entrance through thin walled cells without brown contents which lie on either side of the "Porenkork" mass.—*R. M. Holman*.

873. OAKLEY, R. A., AND MORGAN W. EVANS. *Rooting stems in timothy*. *Jour. Agric. Res.* 21: 173-178. *Pl. 39-40.* 1921.—There are 2 distinct types of underground rooting stems of *Phleum pratense*. One type develops when the shoot that produces the new plant is covered with soil early in its growth. In such cases, some of the short internodes at the base of the shoot elongate, thereby pushing the shoot to the surface of the soil. Roots spring from the nodes between these elongated internodes. The other type develops when growing culms are covered with soil. Buds that sometimes form on the culms of such plants frequently develop into shoots and ultimately into independent plants. In this case the culm becomes an underground rooting stem.—Aerial rooting stems in timothy are not common in the United States. They may be formed when weak or decumbent plants come in contact with the soil. This character is not of varietal significance.

There are proposed for the types of rooting stems found, especially in grasses, the following terms: Determinate and indeterminate rhizomes, determinate and indeterminate stolons.—*D. Reddick.*

874. SCHÜRHOFF, P. N. Der Embryosack von *Tussilago Farfara*. [The embryo sac of *Tussilago Farfara*.] Ber. Deutsch. Bot. Ges. 38: 217–219. Fig. 1. 1920.—It is the micropylar megaspore which develops into the embryo sac in this plant. Preparations of mature embryo sacs showed 6 2-nucleate antipodals, or 6 4-nucleate, or 12 2-nucleate, so that in most cases 24 antipodal nuclei were present. Although in some Compositae in which the micropylar megaspore develops into the embryo sac the other 3 megaspores take part in the development of the antipodal tissue, that is not the case in *Tussilago Farfara*. The author calls attention to the apparent systematic significance of the development of the chalazal or of the micropylar megaspore into the embryo sac in different tribes of the Compositae.—*R. M. Holman.*

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entry 663)

875. CORBIÈRE, L., ET E. JAHANDIEZ. Muscinées du Département du Var. [Bryophytes of the department of the Var (France).] Ann. Soc. Hist. Nat. Toulon 4 (Suppl.): 1–63. 1921.—The present report on the bryophytes of the department of the Var is dedicated to the late Lieut. M. MOURET, upon whose collections it is largely based. After citing the earlier works which deal with the region in question, the authors enumerate 248 mosses and 51 hepatics, omitting certain records about which the evidence seems to be insufficient. Each species is accompanied by full data regarding stations and collectors, and many critical notes are interpolated, those dealing with *Fissidens Moureti* Corb. and *Grimmia Pitardi* Corb. being particularly full. The following new varietal names or combinations are proposed: *Cephaloziella Turneri* var. *dentata* (Raddi) Douin, based on *Jungermannia dentata* Raddi in part; *Fabronia pusilla* var. *nervosa* Thériot, based on *F. Schimperiana* Br. eur. not De Not.; and *Trichostomum brachydontium* var. *unguiculatum* (Philib.) Corb. & Jahand., based on *Hymenostomum unguiculatum* Philib. and including *Weisia Alberti* Corb. as a synonym.—*A. W. Evans.*

876. FLEISCHER, MAX. Über die Entwicklung der Zwergmännchen aus sexuell differenzierten Sporen bei den Laubmoosen. [Development of dwarf males from sexually differentiated spores in the mosses.] Ber. Deutsch. Bot. Ges. 38: 84–92. Pl. 2 (colored), 1 fig. 1920.—The author worked particularly on the following 3 species: *Macromitrium Blumei*, *Schlotheimia Koningsbergeri*, and *Trismegistia Brauniana*. In all 3 species he found that the male plants were always dwarf and epiphytic on the female plants. A morphological difference thus exists between male and female plants. Evidence was abundant that the dwarf male plants developed from a primary protonema, that is, had their origin in spores which lodged on the vegetative portions of the female plants. In the *Macromitrium* and the *Schlotheimia* spores of different sizes were found, and the larger spores, containing the greater supply of food, gave rise apparently to the dwarf plants. In *Trismegistia Brauniana* dwarf female plants, as well as dwarf male plants, were found on normal female plants. The dwarf female plants, however, were too young to show archegonia and would probably have developed into normal female plants. These various observations lead the author to conclude that the protonemata of these 3 species are dioecious and that heterospory (sexual differentiation) exists in the spores.—*H. Bergfried.*

877. FLEISCHER, MAX, UND LEOPOLD LOESKE. Iconographia bryologica universalis.—Abbildungen von Moosen aus allen Erdteilen nach Originalzeichnungen sowie aus bryologischen Werken. Serie I: Auswahl von Abbildungen aus Loeske: "Die Laubmoose Europas." [Universal bryological iconography. Illustrations of mosses from all parts of the earth according

to original drawings or from bryological works. Series I: Selection of illustrations from Loe-ske's "Mosses of Europe." 40 pl. Max Lande: Berlin-Schöneberg, 1918.—The present fascicle is the initial number of a series in which it is planned to illustrate a wide selection of mosses. The 40 plates were all drawn from European specimens and represent 80 species belonging to 36 genera. The figures were mostly prepared by P. JANZEN and show individual plants, leaves, and capsules, as well as numerous anatomical details. In connection with each plate, full data are supplied regarding the figures, and the sources of the specimens used in the preparation of the drawings are likewise definitely given. Otherwise there is no descriptive text.—A. W. Evans.

878. HOLZINGER, JOHN M. Notes [on *Physcomitrium pygmaeum*]. Bryologist 24: 26-27. 1921.—The article consists of 2 notes supplementary to a paper by ELIZABETH G. BRITTON. The 1st note states that *Physcomitrium pygmaeum* is probably autoicous and adds details regarding spores; the 2nd note records a new station in Minnesota, based on material collected by J. H. SANDBERG, and establishes definitely the autoicous inflorescence of the species.—E. B. Chamberlain.

879. POTTIER, JACQUES. Recherches sur le développement de la feuille des mousses. [Studies on the development of the leaf in mosses.] 25 × 61 cm., viii + 144 p., 32 pl. Imprimerie Durand: Chartres, 1920.—The author first gives a critical account of the work previously done on the development of moss leaves, beginning with an article by MORREN, which appeared in 1840. His own investigations were made on serial microtome sections, and in several cases reconstructions of young leaves in plastiline were prepared. The mosses studied included the following species, representing various natural groups: *Andreaea crassinervia*, *A. angustata*, *Mnium undulatum*, *M. punctatum*, *Funaria hygrometrica*, *Dicranum scoparium*, *Atrichum undulatum*, *Barbula ruralis*, and *Leucobryum glaucum*. *Andreaea crassinervia* and *Mnium undulatum* are described and figured in great detail, and plastiline models of leaves in various stages of development are shown in photographic reproduction. The other species are treated more briefly. As a result of his studies the author draws the following conclusions: (1) A moss leaf grows by means of an initial cell only at the beginning of its development; (2) the region of active cell division, in the course of the ontogeny of the leaf, is shifted from the apex to the base; (3) the apex is differentiated very early; (4) in certain species of *Andreaea* with costate leaves, the initial cell sometimes shows 2 cutting faces, as in the more highly evolved mosses; (5) in *Mnium punctatum*, the leaf-margins are not comparable with the nerve in their development; (6) groups of "sténocystes" (auxiliary cells) in the nerve do not always originate in the same way; (7) *Leucobryum glaucum* shows an asymmetry in its leaves, agreeing in this respect with the other mosses.—A. W. Evans.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

(See also in this issue Entries 653, 980, 1030, and those in the section Pathology)

FUNGI

880. BEELI, M. Note sur le genre *Meliola* Fr. Espèces et variétés nouvelles recoltées au Congo. [Note on the genus *Meliola* Fr. New species and varieties collected in the Congo.] Bull. Jard. Bot. Etat [Bruxelles] 7: 89-160. 1920.—A general synopsis of the species of *Meliola* based on morphological characters and host relationships is given. A number of new species and new varieties are described. A new genus, *Meliolinopsis*, is founded for species with cylindrical, persistent, 8-spored asci, the type species being given as *M. megalospora* (Rehm) Beeli. The 2 genera, *Meliola* and *Meliolinopsis*, are recognized, the former being subdivided into the sub-genera *Meliolina*, *Irene*, and *Meliolaste*. An analytical key to genera and sub-genera is given.—Henri Micheels.

881. DANA, B. F. Two new species of *Sclerotinia*. [Abstract.] *Phytopathology* 11: 106. 1921.—*Sclerotinia demissa* n. sp. attacks leaves, twigs and fruits of *Prunus virginiana*. *Sclerotinia gregaria* n. sp. attacks the leaves and fruits of *Amelanchier cusickii*.—B. B. Higgins.

882. DOIDGE, ETHEL M. Some changes in nomenclature of South African Ascomycetes. *South African Jour. Nat. Hist.* 2: 39–41. 1920.—A number of changes in the nomenclature of South African Ascomycetes have been rendered necessary by the appearance of the recent work of Theissen and Sydow. Thirteen new combinations resulting from the transfer of species from *Meliola* to *Irene* are here given.—E. M. Doidge.

883. GERHARDT, KARL. Über das Auftreten der Schlauchfrüchte von *Oidium Tuckeri* am Weinstock. [On the appearance of ascocarps of *Oidium Tuckeri* on grapevines.] *Ber. Deutsch. Bot. Ges.* 38: 156–158. 1920.—In October and November, 1919, the author found perithecia of *Uncinula necator* on old plants of grape in the Jena botanical garden. This is only the 2nd reported occurrence of the ascocarps in Germany. The author describes the perithecia and reports attempts, as yet unsuccessful, to germinate the ascospores. He attributes the production of the perithecia to the unusually abrupt fall in temperature in the vicinity of Jena in the middle of October 1919. Their absence from green leaves, relative scarcity on red leaves, and abundance on yellow fallen leaves in which no anthocyanin had been formed suggested a disturbance of transfer of material in the leaf resulting from the sudden depression of the temperature as the cause of the production of the ascocarps.—R. M. Holman.

884. HÖHNEL, FRANZ VON. Über *Pseudopeziza*, *Pyrenopeziza*, *Ephelina*, und *Spilopodia*. [On *Pseudopeziza*, *Pyrenopeziza*, *Ephelina*, and *Spilopodia*.] *Ber. Deutsch. Bot. Ges.* 38: 96–101. 1920.—The author discusses the synonymy and relationships of these genera. He considers the genus *Pyrenopeziza* to be made up in part of overwintered forms of *Pseudopeziza*. The remaining species of the genus *Pyrenopeziza* he assigns to the genus *Excipula*.—R. M. Holman.

885. HÖHNEL, FRANZ VON. Über die Gattung *Phlyctaena* Desmazières. [On the genus *Phlyctaena* Desmazières.] *Ber. Deutsch. Bot. Ges.* 38: 102–110. 1920.—The author states that 2 fungi, in his opinion generically distinct, were described as the type of this genus under the name *Phlyctaena vagabunda*. One of these grew on the stem of *Psoralea bituminosa*, the other on that of *Tamus communis*. Inasmuch as the fungus on *Tamus* has typical pycnidia, in contradiction to Desmazières' generic description, and since the fungus on *Psoralea* was described as having false perithecia formed only by the blackened epidermis, the writer concludes that the fungus on *Psoralea* is the type species of the genus. The form growing upon *Tamus* he considers identical with *Ascochyta caulium* Libert, and concludes on the basis of characteristics indicating its close affinity to *Rhabdospora* that it must be called *R. caulium* (Lib.) v. H., at least until a critical investigation of the genus *Rhabdospora* is undertaken. The synonymy of other published species of *Phlyctaena* is also discussed.—R. M. Holman.

886. HÖHNEL, FRANZ VON. Über *Botryosphaeria*, *Epiphyma* und *Pilgeriella*. [On *Botryosphaeria*, *Epiphyma*, and *Pilgeriella*.] *Ber. Deutsch. Bot. Ges.* 38: 111–116. 1920.—The author discusses the synonymy and relationships of a number of species of the genera named. He states that *Gibberella* Sacc. 1877 is the same as *Botryosphaeria* Ces. et de Not. 1863, that according to the laws of nomenclature the species of *Gibberella* must be placed in *Botryosphaeria* Ces. et de Not., and that for the species of the genus *Botryosphaeria* Sacc. the name *Melanops* Nitschke 1869 must be employed. The author denies the sharp distinction which Theissen assumes in the development of the nucleus of the Pseudosphaeriaceae, Sphaeriales, and Dothideales. *Botryosphaeria* Sacc. 1877 he considers a genus of the Dothideaceae. *Botryosphaeria* *Dothidea* (Moug.) Ces. et de Not. he places in *Catacauma* as *C. Dothidea* (Moug.) v. H. The author's *Botryosphaeria* *Molluginis*, which was placed by Theissen and Sydow (*Ann. Mycologici* 13: 297. 1915) in the genus *Amerodothis*, he now, on the basis of further study, places in *Dothidella* as *D. Periclymeni* (Fckl.) var. *Molluginis* v. H. or *Dothi-*

della Molluginis v. H.; and *Botryosphaeria anceps* v. H. he transfers provisionally to *Wallrothiella*. He questions whether the new genus *Epiphyma* established by Theissen for the fungus last mentioned is sufficiently distinct from *Wallrothiella* and states that in any event it is not one of the Pseudosphaeriaceae. *Pilgeriella perisporioides* P. Henn., though superficial in its growth, he considers a typical member of the Pseudosphaeriaceae.—R. M. Holman.

BACTERIA

887. JENNISON, HARRY MILLIKEN. *Bacillus atrosepticus* van Hall the cause of the black-leg disease of Irish potatoes. [Abstract.] *Phytopathology* 11: 104. 1921.—A comparative study of subcultures from *Bacillus atrosepticus* van Hall, *B. phytophthorus* Appel, *B. solonisaperus* Harrison, *B. melanogenus* Pethybridge and Murphy, and of the potato blackleg organism isolated from diseased potatoes in various parts of the United States, show that they are all the same organism. Because of priority *Bacillus atrosepticus* van Hall is retained as the proper name for the organism.—B. B. Higgins.

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

(See also in this issue Entries 668, 769, 1100)

888. BERRY, EDWARD W. A palm nut from the Miocene of the Canal Zone. *Proc. U. S. Nation. Mus.* 59: 21-22. *Fig. 3.* 1921.—The author describes the nuts of *Iriartites Vaughani*, a new species, from the Miocene Gatun formation of the Panama Canal Zone.—E. W. Berry.

889. BERRY, EDWARD W. Tertiary fossil plants from Costa Rica. *Proc. U. S. Nation. Mus.* 59: 169-185. *Pl. 22-27.* 1921.—In addition to *Heliconia* sp., *Hieronymia lehmanni*, *Buettneria cinnamomifolia*, and *Nectandra areolata*, the author describes the following new species from the Miocene of Costa Rica: *Piperites cordatus*, *P. quinquecostatus*, *Ficus talamancana*, *Anona costaricana*, *Inga sheroliensis*, *Goeppertia tertiaria*, *Nectandra woodringi*, and *Phyllites costaricensis*.—E. W. Berry.

890. BERRY, EDWARD W. [Rev. of: ARBER, E. A. N. *Devonian floras*. 100 p., 47 fig. University Press: Cambridge, 1921 (see Bot. Absts. 8, Entry 2086).] *Amer. Jour. Sci.* 1: 514-515. 1921.

891. SAHNI, B. Petrified plant remains from the Queensland Mesozoic and Tertiary formations. *Queensland Geol. Surv. Publ.* 267. 48 p., 5 pl., 10 fig. 1920.—This paper gives the results of a study of large collections of petrified woods from the Triassic, Jurassic, and Tertiary of Queensland. The 2 petrified fern stems described by KIDSTON and GWYNNE VAUGHAN as *Osmundites gibbiana* and *O. dunlopi* from the Jurassic of Otago, New Zealand, are recorded from the Jurassic Walloon series of Queensland. The following new species of coniferophyte woods are described: *Cedroxylon brisbanense* from the Triassic Ipswich series; *Cupressinoxylon walkomi*, *C. dunstani*, and *Mesembrioxylon sewardi* from the Jurassic Walloon series; and *M. fusiforme* and *M. fluviale* from the Tertiary. The genus *Mesembrioxylon* is a recent proposal of Seward for woods from the Jurassic to the Tertiary which resemble *Podocarpus* and *Phyllocladus*, but of uncertain botanical affinity. Two different species of dicotyledonous woods are described from the Tertiary, *Pataloxylon scalariform* and *P. porosum*; the genus is new, and no hint as to its botanical affinity is given.—E. W. Berry.

892. WIELAND, G. R. Monocarp and pseudomonocarp in the cycadeoids. *Amer. Jour. Bot.* 8: 218-230. *Pl. 4, fig. 1.* 1921.—The author discusses, with illustrations, the monocarpic habit or the production of fruit once in a normal lifetime. This habit is confined at present to angiosperms. He suggests that certain of the Cretaceous cycadeoids were also monocarpic, since specimens have been found in which great numbers of cones, all apparently of the same age, are borne over the whole trunk, indicating that the plant had entered its single reproduc-

tive period. A case of "pseudomonocarp" is cited in *Pinus attenuata*, where the mature cones do not drop off but are embedded in the trunk and often do not shed their seeds till the tree dies. The author also calls attention to the xerophyllous characters of the cycadeoids, as shown particularly by the dense masses of scaly ramentum with which the stems and leaves are covered. He believes that the early Cretaceous climate, under which they thrived, was a rather dry and cool one.—*E. W. Sinnott*.

893. YABE, H., AND S. ENDO. Discovery of stems of a Calamites from the Paleozoic of Japan. *Sci. Rept. Tohoku Imp. Univ. (Geology)* 5³: 93-95. *Pl. 15, fig. 7-8*. 1921.—A detailed description and illustration of a calamite of the *Arthropitys* type from the marine Chichibu formation (upper Paleozoic) of Japan is presented.—*E. W. Berry*.

PATHOLOGY

G. H. COONS, *Editor*

C. W. BENNETT, *Assistant Editor*

(See also in this issue Entries 612, 639, 644, 653, 735, 791, 794, 832, 881, 887)

PLANT DISEASE SURVEY (REPORTS OF DISEASE OCCURRENCE AND SEVERITY)

894. ANONYMOUS. Mosaic disease of canes. *Jour. Jamaica Agric. Soc.* 24: 313-314. 1920.—A report of the occurrence of the mosaic (mottling) disease of sugar cane in Jamaica is given. Governmental regulations providing for the eradication of the disease are also given.—*John A. Stevenson*.

895. ANONYMOUS. Plaga blanca de las cebollas. [White disease of onions.] *Rev. Agric. [Mexico]* 5: 601-602. *1 fig.* 1920.—A disease of onions due to *Fusarium* sp. has caused losses to growers near Ciudad Victoria, Tamaulipas, Mexico.—*John A. Stevenson*.

896. BYARS, L. P. Notes on the citrus-root nematode, *Tylenchulus semipenetrans* Cobb. *Phytopathology* 11: 90-94. *Fig. 1*. 1921.—Examination of trees in all the principal Citrus growing sections of Florida indicates that the nematode disease of Citrus trees occurs in only 3 isolated localities, namely, Glen St. Mary, Gainesville, and Brooksville. Tests of the hot water treatment for infested seedlings indicate that it may be developed into a feasible method of control.—*B. B. Higgins*.

897. GARRETT, A. O. *Septoria Negundinis* Ellis & Ev. in Zion National Park. *Phytopathology* 11: 100. 1921.

898. HEALD, F. D. Some new hosts for the *Rhizoctonia* disease. [Abstract.] *Phytopathology* 11: 105. 1921.—*Rhizoctonia* has been found attacking strawberries (*Fragaria* sp.) and wild onions (*Allium* sp.).—*B. B. Higgins*.

899. HEALD, F. D. The skin spot (*Oospora pustulans*) of the Irish potato. [Abstract.] *Phytopathology* 11: 104-105. 1921.—In a car load of potatoes shipped from British Columbia 95 per cent showed lesions of this disease.—*B. B. Higgins*.

900. JENNISON, HARRY MILLIKEN. Observations upon the bacterial blight of field and garden peas in Montana. [Abstract.] *Phytopathology* 11: 104. 1921.—A very serious disease of field and garden peas (*Pisum sativum* L.) is produced by *Pseudomonas pisi* Sack. Dissemination is thought to be due largely to contaminated seed.—*B. B. Higgins*.

901. MADARIAGA, A. Plagas y enfermedades del maiz. [Diseases and pests of corn.] *Rev. Agric. [Mexico]* 4: 449-455. 1919.—The rust (*Puccinia*) and smut (*Ustilago maydis*) of Indian corn are discussed.—*John A. Stevenson*.

902. MEDALLA, M. G., AND G. M. REYES. *Fiji disease of sugar cane*. Philippine Farmer 7: 3, 5. 1921.—The paper presents a discussion of Fiji disease to the sugar cane growers of the Philippines. The disease is described and its recent introduction into the Philippines demonstrated. According to the authors it is at present confined to the Islands of Mindoro and Luzon. The organism (suspected of being of protozoan nature) discovered by Dr. H. L. LYON is constantly associated with the disease. Control attempts in the Philippines have been undertaken based upon: (1) A domestic quarantine of the affected provinces; (2) the distribution of resistant varieties in provinces where the disease occurs; and (3) selection of disease-free seed on affected plantations.—*H. Atherton Lee*.

903. MELCHERS, L. E. *Physoderma (zeae-maydis?) in Kansas*. Trans. Kansas Acad. Sci. 29: 131-132. 1920.—The presence of this fungus in Kansas on *Zea mays* is noted; pertinent characteristics are given.—*F. C. Gates*.

904. MELCHERS, L. E. *Plant disease report for Kansas, 1917*. Trans. Kansas Acad. Sci. 29: 132-138. 1920.—The paper contains a brief report of the distribution and severity of 25 cereal diseases, 11 vegetable diseases, 16 fruit diseases, and winter injury.—*F. C. Gates*.

905. RAMÍREZ, ROMÁN. *Viruela del algodón*. [Cotton rust.] Rev. Agric. [Mexico] 5: 461. 3 fig. 1920.—Cotton rust caused by *Aecidium gossypii* E. & E. has caused losses to growers in Coahuila and Durango, Mexico.—*John A. Stevenson*.

906. SIMONETTO, MOISÉS. *Nuevas orientaciones en sanidad vegetal*. [New situations in plant pathology.] Rev. Agric. Com. y Trab. [Cuba] 3: 349-356. 4 fig. 1920.—In part 1 of the paper are discussed the dangers of the importation of plant diseases and the preventive measures that may be taken. A floating fumigation building is suggested and described. In part 2 reference is made to a convention on plant sanitation held in Washington on December 20, 1920. In part 3 an outline is presented of urgently needed investigation on the concomitant causes of the mosaic of sugar-cane. In part 4 it is pointed out that in some cases mosaic disease has caused losses reaching 50 per cent and is thus a real danger to Cuban sugar-cane growers. One focus of infection located at the Mercedes plantation is said to have been controlled.—*F. M. Blodgett*.

907. TRUJILLO PELUFFO, AGUSTIN. *Desarrollo de las enfermedades criptogamicas en las viñedos durante el presente año*. [Fungous diseases in the vineyards during the present year.] Defensa Agric. [Uruguay] 2: 43-46. 3 fig. 1921.—Powdery mildew (*Oidium*), anthracnose (*Gloeosporium*), and downy mildew (*Plasmopara*) have caused heavy losses due in part to weather conditions (high humidity) but to a larger extent to the failure of the growers to spray at the right time and in a careful manner.—*John A. Stevenson*.

THE HOST (RESISTANCE; SUSCEPTIBILITY; MORBID ANATOMY AND PHYSIOLOGY)

908. HURD, ANNIE MAY. *Seed-coat injury and viability of seeds of wheat and barley as factors in susceptibility to molds and fungicides*. Jour. Agric. Res. 21: 99-122. Pl. 13-23. 1921.—An unbroken seed coat affords protection against attack of living seeds by *Penicillium* sp. or *Rhizopus nigricans* either in damp storage, in the soil, or in blotter germinations; but infection may occur on such seeds if germination is retarded by means of low temperature. By means of artificial injuries, it is found that injury over the endosperm results fatally when either organism is present and under any 1 of the 3 conditions mentioned, while an injury over the embryo is not at all detrimental. Seeds that are dead or weakened from any cause are attacked by these fungi even though the seed coat is intact. These fungi do not affect seeds when the temperature is 10°C. or lower and *Penicillium* sp. requires an atmospheric humidity of 80 per cent. *Aspergillus* sp. grows on wheat at a humidity of 70 per cent.—Seeds mechanically injured and exposed to copper sulphate solution [3 per cent] are injured in 5 minutes when the break is over the embryo and in 1 hour if the break is over the endosperm.—The dam-

age that will be done to seed wheat by copper-sulphate treatment and by saprophytic fungi can be predicted by examination of the physical condition of the seed for mechanical injury and the location of the injuries. Machine thrashing usually breaks seed coats of wheat directly over the radicle. Turkestan barley and varieties of similar structural type are broken at the hilum either in machine or hand thrashing and barley seed is more easily injured than wheat seed.—Perfect wheat seed is injured by exposure to saturated copper sulphate solution for 6 hours or more, indicating that the seed coat is not completely semipermeable.—*D. Reddick.*

909. KORSTIAN, CLARENCE F., CARL HARTLEY, LYLE F. WATTS, AND GLENN G. HAHN. A chlorosis of conifers corrected by spraying with ferrous sulphate. *Jour. Agric. Res.* 21³: 153-171. 4 fig. 1921.—All coniferous species grown in a nursery in Idaho are affected with chlorosis. With chlorosis is associated poor growth of roots, stems and leaves, failure to form terminal buds, and susceptibility to winter injury. Excessive soil moisture does not seem to be a factor in producing a chlorotic condition. The soils on which chlorosis of conifers occurs all contain considerable amounts of carbonate and have been formed in part from limestone. The water supply at one nursery contains much calcium bicarbonate. No correlation could be found between occurrences of chlorosis and the amount of calcium or of carbonate present. Chlorosis in western yellow pine, *Pinus ponderosa*, and jack pine, *P. banksiana*, has been definitely corrected by spraying the plants at 10-day intervals with 1 per cent ferrous sulphate. Douglas fir, *Pseudotsuga taxifolia*, gave similar but less decisive results. Sulphate of iron of 2 per cent strength is injurious.—The literature on chlorosis is reviewed and a bibliography of 24 titles appended.—*D. Reddick.*

910. LEE, H. ATHERTON. The increase in resistance to citrus canker with the advance in maturity of citrus trees. *Phytopathology* 11: 70-73. 1921.—On the evidence obtained through extensive field observations, the hypothesis is advanced that as citrus trees advance in maturity there is a gradual increase in their resistance to citrus canker. Citrus trees of the more resistance species, *Citrus nobilis*, *C. mitis*, etc., often show great susceptibility to canker when young while more mature trees are practically free from injury. This is apparently true also, to a less noticeable extent, of the more susceptible species.—*B. B. Higgins.*

911. SCHAFFNIT, E. Untersuchungen über die Brennfleckenkrankheit der Bohnen. [Investigations on anthracnose of beans.] *Mitteil. Deutsch. Landw. Ges.* 36: 199-201. 1921.—Bean varieties resistant and susceptible to anthracnose were grown with various fertilizers, especially those supplying an excess of nitrogen. The plants as well as controls were inoculated with the anthracnose organism, but no appreciable change in relative resistance was found as a result of the fertilizer applications. Greater diastase and protease content was found in the susceptible than in the resistant varieties.—*Wilber Brotherton, Jr.*

THE PATHOGENE (BIOLOGY; INFECTION PHENOMENA; DISPERSAL)

912. BURKHOLDER, WALTER H. The bacterial blight of bean: a systemic disease. *Phytopathology* 11: 61-69. 1921.—The bean blight organism (*Bacterium phaseoli*) may infest the vascular system of the bean (*Phaseolus vulgaris*) plant, with or without the production of surface lesions and symptoms of bean blight as generally noted. The bacteria in the cotyledons of plants from infected seed may enter the vessels and pass down into the stem of the young plants. The symptoms produced by this vascular invasion appear to depend, in some way, on environmental conditions. The plants may wilt at once, lesions may appear on the stems and leaves, or the plants may show incipient wilting or dwarfing without the appearance of definite lesions. The seeds are often invaded through the vessels without the production of lesions on either the seed coat or the pod.—This systemic infection does not produce the greatest amount of damage, but it is of importance in seed selection. It also acts as an important source of infection for the peculiar epidemics of blight which appear in late summer.—*B. B. Higgins.*

913. HEALD, F. D. Relation of spore load to the per cent of stinking smut (*Tilletia tritici*). [Abstract.] *Phytopathology* 11: 103-104. 1921.—The per cent produced is approximately proportional to the number of smut spores per grain of wheat until the maximum is reached, between 65,000 and 100,000 per grain.—B. B. Higgins.

914. HEINRICHER, E. *Arceuthobium Oxycedri* (DC.) M. Bieb auf *Cupressus*. [*Arceuthobium Oxycedri* (DC.) M. Bieb on *Cupressus*.] *Ber. Deutsch. Bot. Ges.* 38: 220-223. 1920.—This paper is a report of experiments carried out with the intention of testing the ability of the organism named to attack *Pinus silvestris*, *Cupressus pendula*, and *Chamaecyparis pisifera*. Positive results were secured with *Cupressus* spp. only. Since only 1 out of 67 seeds sown on the cypress developed into a plant on that host the author does not consider the negative results with *Chamaecyparis* as conclusive evidence of the parasite's inability to use the latter as a host.—R. M. Holman.

915. MORSE, W. J. The transference of the potato late blight by insects. *Phytopathology* 11: 94-96. 1921.—A case is noted where the spores of the potato late blight fungus (*Phytophthora infestans*) were apparently carried 150 yards by flea beetles (*Epitrix cucumeris*).—B. B. Higgins.

DESCRIPTIVE PLANT PATHOLOGY

916. ANONYMOUS. Degeneración de la papa y manera de evitarla. [Degeneration of the potato and means of preventing it.] *Rev. Agric. [Mexico]* 4: 415-421. 5 fig. 1919.—Degeneration of potato varieties is due partly to *Phytophthora infestans* and other fungi and partly to unknown causes. "The tendency of certain varieties toward degeneration, expressed by low yields, spindling sprouts and related phenomena, is often allied with smooth, shallow-eyed tubers. A lack of diastase in the tubers and poor fibro-vascular development also mark this condition.—John A. Stevenson.

917. ANONYMOUS. Report on Pè-byu-gale disease and the application of measures to check its spread, 1918-19. Appendix to *Ann. Rept. Agric. Sta., Agric. Chem., Agric. Eng., Asst. Bot. Northern Circle, and Asst. Entomol. Burma 1918-1919*: 95-99. 1 map. 1920.—This is a sclerotal disease on Pè-byu-gale (*Phaseolus lunatus* L.) reported as exceedingly destructive over localized areas near Mandalay, Burma. Despite burning badly infected fields, and rotation of crops, the disease is spreading. [See also *Bot. Absts.* 9, Entry 941.]—Winfield Dudgeon.

918. BARSS, H. P. Bean blight and bean mosaic. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 192-196. Fig. 56-59. 1921.—Notes and recommendations are given relative to the occurrence and control of blight, probably caused by *Bacterium phaseoli*, and of mosaic. The variety Berrendo from Mexico shows no symptoms of mosaic even when artificially inoculated, yet after inoculation it may transmit the disease to other varieties.—E. J. Kraus.

919. BARSS, H. P. Physiological disorders of developing fruits. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 159-166. Fig. 44-47. 1921.—The following are assumed to be due to a lack of adjustment between water needs and water supply: (1) Shriveling of grapes; (2) drouth spot, cork, blister, punk, and bitter pit of apple; (3) black end of pears and of walnuts; (4) gum spot of prunes; and (5) internal browning of potato.—E. J. Kraus.

920. BIANCHI, ANGEL T. Enfermedades de la papa. [Potato diseases.] *Defensa Agric. [Uruguay]* 2: 31-32. 1921.—*Phytophthora infestans*, *Fusarium solani* (dry rot), and *Bacillus amylobacter* (wet rot) are considered.—John A. Stevenson.

921. BRYON, MAY K. A bacterial budrot of cannas. *Jour. Agric. Res.* 21³: 143-152. Pl. 31-38. 1921.—The disease is essentially one of young tissue and moist conditions in *Canna indica*. The lesions vary from small spots to brown irregular areas extending several centimeters along the leaf blade. Young shoots are often killed, the flower buds blighted, and

the stalks decayed. The disease is known only from Washington, D. C., and Urbana, Illinois. The cause of the disease is *Bacterium cannae* n. sp., group number 211. 3333023. Cultural and other biological characters are presented in detail. Infection takes place through stomates and spreads through the intercellular spaces of the parenchyma of leaf blade, petiole, and stalk. Overcrowding and overwatering of young plants in the hothouse seem to be predisposing factors. Avoidance of these conditions is at present the only known means of controlling the disease.—D. Reddick.

922. GARDNER, MAX W., AND JAMES B. KENDRICK. Bacterial spot of tomato. Jour. Agric. Res. 21²: 123-156. Pl. 24-28. 1921.—Bacterial spot of tomato [*Lycopersicum*] is widely distributed in North America. It is a typical spot disease of fruit, stem, and leaf. It occurs on practically all varieties of tomatoes and also on pepper [*Capsicum*]. Infection of potato foliage has been secured. The disease is caused by *Bacterium exitiosum* n. sp., group number 211. 3332513. Cultural and other biological characters are described in detail. The organism produces no acid or gas with carbohydrates, is highly sensitive to sunlight, very resistant to desiccation, and has its limit of acid toleration at P_{H5} .—Infection of foliage is stomatal and is readily secured by atomizer inoculations; fruit infections occur only through wounds. Mature fruits are not infected and this is attributed to high acidity. The organism overwinters on the surface of seed and is thus disseminated. Disinfection of seed in mercuric chloride, 1 to 3000, for 5 minutes is safe and effective for control.—The paper is a monographic treatise.—D. Reddick.

923. GENTNER, GEORG. Eine Bakteriose der Gerste. [A bacteriosis of barley.] Centralbl. Bakt. II. Abt. 50: 428-441. Fig. 2. 1920.—A monographic treatise on a bacterial disease of barley, occasionally found on wheat and rye. The disease is characterized by the appearance of brown spots on the nodes and upper internodes. The leaves of diseased plants are covered with brown blotches or dots, the upper ones becoming prematurely yellow and dry. The disease is further characterized by the production of poorly filled heads with prematurely filled kernels. The glumes may become split. In extreme cases, the kernels may show longitudinal rifts extending deep into the endosperm. The disease is caused by *Bacillus cerealium* n. sp., described as follows: Short, motile rod, $1.5-3 \times 0.6-0.8\mu$, with 1-2 polar flagella; spore forming, aerobic, non-liquefying, red-pigment producing on media. The bacillus is capable of dissolving the middle lamella, starch grains, and cell walls in the interior of the kernel, but not in the hull. It does not dissolve cellulose of filter paper, nor does it rot potato or carrot. The cleavage products and the pigment produced are dextrin-like. The disease is most common in dry seasons. The organism persists in the soil and in the grain, which under conditions of moist storage may become seriously infested.—Anthony Berg.

924. HEALD, F. D. Moldy core of Stayman Winesap. [Abstract.] Phytopathology 11: 105. 1921.—Several species of fungi have been found producing a moldy growth in the core of apples having an open calyx; but of these only species of *Penicillium* and of *Alternaria* produced a decay of the fruit.—B. B. Higgins.

925. HOTSON, J. W. A new species of *Exobasidium*. [Abstract.] Phytopathology 11: 106. 1921.—A new, as yet unnamed, species of *Exobasidium* attacks the young branches of *Vaccinium parvifolium*.—B. B. Higgins.

926. JAGGER, IVAN C. Bacterial leafspot disease of celery. Jour. Agric. Res. 21: 185-188. Pl. 46-47. 1921.—The disease is practically confined to leaf blades of celery [*Apium graveolens*] and is known from New York and Michigan. The lesions are distinguishable from those of *Septoria* leaf blight only by the absence of pycnidia. The cause of the disease is *Pseudomonas apii* n. sp., group number 211. 2322033. Cultural and other biological characters are presented in condensed form.—Field experiments show that the disease may be controlled by suitable applications of Bordeaux mixture, 1 per cent, but that lime-sulphur solution, 1:25, is not effective.—D. Reddick.

927. LEHMAN, S. G. Soft rot of pepper fruits. *Phytopathology* 11: 85-87. 1921.—A hitherto unknown rot of sweet pepper (*Capsicum annuum* var. *grossum*) fruit is described. It appears first as a small water-soaked spot at the blossom end. The infected area enlarges rapidly, becomes lighter in color and soft, and after a period of 4 or 5 days involves the entire fruit. The causal organism is a phycomycete which seems to be identical with *Pythium de Baryanum*.—B. B. Higgins.

928. MCKAY, M. B. Blossom-end rot of tomatoes. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 185-186. *Fig. 52*. 1921.—The relation of the disease to water supply, and suggestions for its control are given.—E. J. Kraus.

929. MCKAY, M. B. Mosaic disease of tomatoes. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 179-184. *Pl. 14, fig. 51-52*. 1921.—Effects of the disease on foliage and fruit are described. General discussion, notes on occurrence in Oregon, and suggestions for control are presented.—E. J. Kraus.

930. MCKAY, M. B. Western yellow tomato blight. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 174-178. *Fig. 50*. 1921.—Both *Fusarium* and *Rhizoctonia* appear to be associated with the disease, though the former seems to be the more common and important. There are no resistant varieties, but such are being sought. Occurrence and means for decreasing losses are discussed.—E. J. Kraus.

931. MILES, L. E. The mosaic disease of sugar cane in Mississippi in 1920. *Mississippi Agric. Exp. Sta. Bull.* 191. 12 p., 1 fig. 1920.—A brief history of the disease is given, its symptoms, and distribution over the state; quarantine and control measures are also mentioned.—H. B. Brown.

932. NEAL, D. C. Diseases of the sweet potato in Mississippi and their control. *Mississippi Agric. Exp. Sta. Bull.* 190. 16 p., 12 fig. 1920.—In an illustrated popular bulletin, the author discusses the economic importance of the most common sweet potato diseases, their symptoms, causes, control measures, and distribution over the state. A short bibliography is appended.—H. B. Brown.

933. PRITCHARD, F. J., AND W. S. PORTE. Collar-rot of tomato. *Jour. Agric. Res.* 21: 179-184. *Pl. 41-45*. 1921.—This disease of tomato (*Lycopersicum*) takes the form of a rotting and girdling of the stem of young plants at the surface of the soil. It is essentially a disease of the seed-bed and occurs in Maryland, New Jersey and Delaware. The disease is caused by *Verticillium lycopersici* n. sp.; a technical description is presented.—Infection experiments were made with this fungus in comparison with *Macrosporium solani* and *Rhizoctonia solani*. All 3 organisms produce a girdling of stems of seedling tomatoes when applied to the uninjured stems or when mixed with the potting soil. *R. solani* often fails to infect and the lesions are superficial. Trials with potato (*Solanum tuberosum*) and with horse nettle (*S. carolinense*) show that these plants are also hosts for the 3 organisms with typical collar rot development, but, as with tomato, *Rhizoctonia solani* is weakly parasitic.—D. Reddick.

934. RAMÍREZ, RAMÓN. Enfermedad en los naranjos de Turicato, Michoacan. [An orange disease in Turicato, Michoacan.] *Rev. Agric. [Mexico]* 5: 547. 1 fig. 1920.—A rot of oranges due to *Penicillium* sp., *Aspergillus* sp. and other molds following initial injury by insects is described.—John A. Stevenson.

935. RAMÍREZ, RAMÓN. Enfermedad de los pinos de Guadalajara. [A pine disease in Guadalajara.] *Rev. Agric. [Mexico]* 5: 601. 1 fig. 1920.—A disease of the twigs of *Pinus* sp. due to *Schizotrichum* sp. is described briefly.—John A. Stevenson.

936. RITZEMA BOS, J. Myn proefveldje by het Instituut voor Phytopathologie van 1906 tot 1920. [My experiment field at the Phytopathological Institute during the period 1906-1920.] *Tijdschr. Plantenz.* 27: 29-44. 1921.—In this work the results obtained upon various phy-

topathological subjects are summarized: (1) Recovery of diseased plants after transplanting to the experiment field; (2) soil sickness; (3) production of sclerotia of *Claviceps purpurea* in large quantities; (4) ergot of rye in relation to grasses; (5) use of chemicals as fungicides and insecticides; (6) control of celery leaf spot (*Septoria apii*) with Bordeaux mixture.—*D. Atanasoff*.

937. ROSEN, H. R. Further observations on a bacterial root and stalk rot of field corn. *Phytopathology* 11: 74-79. *Fig. 1-4*. 1921.—In continuing work formerly reported [see *Bot. Absts.* 3, Entry 2742] field observations and inoculations have shown that 17 varieties of field corn and 1 of sweet corn are susceptible to this disease. The latter is characterized by localized rotting of the roots and lower nodes of the stalk, and by spots on the blades, sheaths, and husks. The organism has been obtained in 15 isolations from the various types of lesions; and similar lesions have been reproduced by inoculations with pure cultures of the organism, which is as yet unnamed.—*B. B. Higgins*.

938. SCHULTZ, E. S., AND DONALD FOLSOM. Leafroll, net-necrosis, and spindling-sprout of the Irish potato. *Jour. Agric. Res.* 21: 47-80. *Pl. 1-12*. 1921.—The symptoms, geographical distribution, and economic importance of leafroll are briefly discussed. The disease is found to be consistently carried over winter in the tubers. It can be transmitted by means of grafts, using either parts of diseased tubers or scions from diseased plants. The plants show leafroll symptoms about 1 month after inoculation as well as in their progeny. Observations made in the field and in the greenhouse indicate that aphids are agents of transmission. Experiments with caged plants in the field and in the greenhouse show that aphids are able to transmit leafroll. Two tuber units were inoculated in the field with *Myzus persicae*, both developing symptoms of leafroll, and showing leafroll in a large percentage of their progeny. Eight plants were inoculated with aphids in the greenhouse and all developed leafroll, while checks grown from the same tubers remained healthy even though some of them were fed upon by non-virulent aphids. An experiment on overwintering in the soil gave negative results. Tubers showing net-necrosis almost invariably produce leafroll plants, although leafroll plants only occasionally produce net-necrosis tubers. Net-necrosis often fails to appear in the progeny of tubers affected with it. The development of net-necrosis by leafroll tubers seems to depend on the variety, time of infection, and other factors not now understood. Net-necrosis is one of the causes of spindling sprout. Experiments with rogueing indicate that this method of control will be effective in northeastern Maine under proper conditions. Leafroll appears to spread less readily than mosaic.—*K. H. Fernow*.

939. STEVENS, F. L. Foot-rot of wheat. *Science* 51: 517-518. 1920.—From evidence gathered from a study of the foot-rot disease the author presents the following facts as fully established. The fungus was isolated from lesions in practically every one of several hundred attempts, and no other species of fungus or other parasite was constantly present. The lesions were always penetrated and occupied by a fungus mycelium that agrees in general character with the fungus in question, and the diseased stems, when placed in humid surroundings, became covered with spores of the fungus. The fungus when inoculated from pure cultures as spores, mycelium, or infected wheat tissue produced disease indistinguishable from foot-rot. Wheat planted in soil with an inoculum of this fungus developed typical foot-rot. The fungus in question is a typical *Helminthosporium*. This foot-rot found in Illinois should be recognized as a disease quite distinct from all others of similar type that have been previously described. It is clearly soil-borne and probably also seed-borne.—*A. H. Chivers*.

940. TAUBENHAUS, J. J. A study of the black and the yellow mold of ear corn. *Texas Agric. Exp. Sta. Bull.* 270. 38 p., 10 fig. 1920.—The annual loss in Texas from black and yellow molds, *Aspergillus niger* and *A. flavus*, is estimated at 5,718,333 bushels. The same molds attack broom corn and stored onions. The black mold is the more destructive to corn.—Tests indicated that while *Aspergillus niger* is found on peanuts, cotton bolls, cowpeas, onions, pomegranates, Irish potatoes, squashes, broom corn, and ear corn, physiological species do

not exist. *Aspergillus niger* can invade the ear only during the milky stage and when it has been injured by the ear worm. Tests show that infected ears should not be used as seed stock.—*L. Pace*.

941. THOMPSTONE, E., AND A. M. SAWYER. Report on the work of the Botanical Section, Northern Circle. Ann. Rept. Agric. Sta., Agric. Chem., Agric. Eng., Bot. Northern Circle, and Asst. Entomol. Burma 1918-1919: 93-95. 1920.—Progress is reported in investigation of a destructive sclerotial disease of *Phaseolus lunatus* [see Bot. Absts. 9, Entry 917]; cotton breeding; and other experimental work.—*Winfield Dudgeon*.

942. WALKER, J. C. Onion smudge. Jour. Agric. Res. 20: 685-721. Pl. 80-85. 1921.—Smudge occurs only on the scales and neck of the bulb of *Allium cepa*. The causal organism is *Colletotrichum circinans* (Berk.) Voglino, heretofore generally known as *Vermicularia circinans* Berkeley. The fungus is pathogenic upon the scales of mature bulbs, but does not attack actively growing parts of the plant with the exception of young seedlings, upon which it sometimes produces "damping off." The fungus overwinters as stromata in infected scales. Conidia are sensitive to desiccation except when remaining in waxy masses on the host; in this latter condition a small percentage remain viable for a considerable period. Abundant rainfall, together with a mean soil-temperature range between 20 and 30°C., favor the rapid development of the disease in the field; hot dry weather in midsummer checks its development. Artificial drying of "sets" immediately following harvest also checks the disease but is not as yet recommended as a general practice.—*H. W. Dye*.

943. WALKER, J. C. Rust of onion followed by a secondary parasite. Phytopathology 11: 87-90. Fig. 1-2. 1921.—A species of *Botrytis* has been found attacking the leaves and seed stems of the top onion (*Allium cepa* var. *bulbellifera*). It enters the host plant always through lesions produced by a rust, apparently *Puccinia asparagi*.—The identity of the *Botrytis* has not yet been determined.—*B. B. Higgins*.

944. WEIR, JAMES R. Polyporus dryadeus (Pers.) Fr. on conifers in the Northwest. Phytopathology 11: 99. 1921.

945. ZELLER, S. M. A Cytospora canker of apple and another "die-back" fungus of interest. [Abstract.] Phytopathology 11: 105. 1921.

946. ZELLER, S. M. A spur blight of pear caused by Botrytis. [Abstract.] Phytopathology 11: 105. 1921.

947. ZELLER, S. M. Heart-rot of prune and peach in Oregon. [Abstract.] Phytopathology 11: 105. 1921.—In western Oregon the greater percentage of heart-rot in peach (*Amygdalus persica*) and prune (*Prunus domestica*) trees is due to *Trametes carnea*. *Lenzites sepiaria* and *Fomes pinicola* also cause some heart-rot in these trees.—*B. B. Higgins*.

948. ZELLER, S. M. Wood decay in orchard trees in Oregon. Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 132-138. Fig. 35-37. 1921.—The organisms causing most serious decay of cherry wood are *Irpex lacteus*, *Polystictus versicolor*, and *P. hirsutus*; of apple and pear wood *P. versicolor*; and of prune wood *Trametes carnea*, *Lenzites sepiaria*, *Fomes pinicola*, *Stereum hirsutum*, and others. Of trees having large pruning wounds a survey showed 97 per cent to be decayed. Painting of the wounds with Bordeaux paste, and about the edges with a mixture of asphalt and paraffin, is recommended. Copper nails or tacks driven into the wound will supplement the antiseptic action of the Bordeaux paste.—*E. J. Kraus*.

ERADICATION AND CONTROL MEASURES

949. BARSS, H. P. Cylindrosporium leaf-spot of prune and cherry. Oregon. Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 156-158. Fig. 42-43. 1921.—Control is effected by spray-

ing with Bordeaux mixture (4-4-50) on May 1 and at intervals of 3 or 4 weeks thereafter until dry weather is permanently established.—*E. J. Kraus.*

950. BARSS, H. P. Grain smuts and their control. Oregon. Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 197-202. *Fig. 60-63.* 1921.—General description and methods of control are given.—*E. J. Kraus.*

951. BARSS, H. P. Onion smut control. Oregon. Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 187-191. *Fig. 54-55.* 1921.—Experiments with, and recommendations concerning, the use of formaldehyde during seeding are given.—*E. J. Kraus.*

952. BARSS, H. P. Peach leaf-curl control. Oregon. Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 145-151. *Pl. 12-13.* 1921.—Notes are given on comparative effectiveness of several sprays containing copper, sulphur, or coal tar derivatives, and the time of application of spray. Thorough spraying with Bordeaux mixture (6-6-50) any time between December 1 and the first part of February resulted in almost perfect control.—*E. J. Kraus.*

953. BARSS, H. P., AND W. A. SMART. Notes on tests with fungicides. Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 167-171. *Fig. 48.* 1921.—The discussion relates to (1) preliminary tests with late summer sprays for apple-tree anthracnose, (2) sugar as a stabilizer for Bordeaux mixture, (3) iron sulphide, an effective aid to thoroughness in spraying, (4) dry-lime-sulphur vs. ordinary liquid lime-sulphur. Experimental data are briefly presented.—*E. J. Kraus.*

954. BROCK, W. S., AND W. A. RUTH. Judging a spray by its chemical content. Proc. Amer. Soc. Hort. Sci. 17: 105-106. 1920 [1921].—The authors point out that a spray material should not be judged solely by its chemical content as such important properties as solubility, rate of decomposition, adhesiveness, absorption of components of the spray or its decomposition products, the effect of light, heat, and moisture upon the material and upon the relation of the material to the plant and to the fungus to be controlled may be ignored. Although the Sherwin-Williams Company recommends a dilution for their dry lime-sulphur which yields a spray containing less sulphur than is present in a liquid lime-sulphur generally accepted as controlling apple fungi and San José scale, the recommended concentration has been found successful in Illinois during 5 years for controlling apple fungi and in 2 localities for 2 years in controlling San José scale. For dependable results repeated field trials in the immediate vicinity seem to be necessary.—*H. W. Richey.*

955. GESCHWIND. Die in den Schwarzkiefernsaatkämpen des Karstes auftretenden schädlichen Insekten und Pilze sowie die Mittel zu ihrer Abwehr. [Insects and fungi in the Austrian pine nurseries of the Karst region and the means of combating them.] Wiener Allg. Forst- u. Jagd Zeitg. 39: 29-30. 1920.—The chief insect enemies of Austrian pine (*Pinus austriaca*) in the nurseries of the Karst region on the east Adriatic coast are discussed as well as the needle cast disease (*Lophodermium pinastri*) and the root decay caused by *Fusoma parasiticum* (*Fusarium blasticola*). There are well known ways of combating all of these pests but the author considers only the effect of laying sods, grass side down, between the drills in the seed beds. The system of laying these sods was developed primarily as a means of protection against high winds and drying effects and also as a means of adding humus to the soil. The method has proved of considerable help in checking insect attack. The activity of the root-decaying fungus seems to depend upon air stagnation. The sods allow a much greater circulation of air over the seed beds than when they are protected from drying out by lattice frames or leafy branches spread over the beds.—*F. S. Baker.*

956. HOLMES, E. M. The silver-leaf disease fungus. Pharm. Jour. 106: 31-32. 1921.—*Stereum purpureum*, proved by PERCIVAL to be the cause of the silver-leaf disease of the plum tree and the Portugal laurel, is described by the author, and directions are given for collecting and burning the fungus, which matures during the late winter and early spring.

The fungus spores attack the trees where the bark is cracked and where gum often exudes from wounds. Probably the best way to prevent attack is to apply pine tar to every crack or abrasion of the bark. It is also suggested that an antiseptic resin, such as a combination of formaldehyde with a resinous base, might be devised as a more sightly remedy.—*E. N. Gathercoal.*

957. MACKIE, W. W., AND F. N. BRIGGS. **Fungicidal dusts for control of smuts.** *Science* 52: 540. 1920.—It has been demonstrated recently that the commonly accepted standard smut treatments with either copper sulphate or formaldehyde are frequently injurious, either producing poor germination or weakening the seedling. Formaldehyde injury seems more severe with wheat when plantings are made in dry soil. Injury from copper sulphate treatments are greater with wheat mechanically injured, as in the threshing process. As an improved method, dust applications of copper sulphate are recommended. Little Club wheat was dusted with spores of *Tilletia tritici* at the rate of 1 part smut spores to 750 parts of seed by weight, and treated by standard formulas as well as by the dust method. Dehydrated copper sulphate mixed with equal parts of calcium hydrate, at the rate of 2 ounces per bushel, controlled smut without injury to germination.—*A. H. Chivers.*

958. OWENS, C. E. **Gooseberry mildew control.** *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 152-155. *Fig. 39-41.* 1921.—Complete control may be obtained by 3 applications of lime-sulphur spray. The 1st of these at a dilution of 1-25, put on when the leaves are emerging from the buds, is most important; the 2nd (1-45) should be put on just before blooming, the 3rd (1-50) just after blooming.—*E. J. Kraus.*

959. SCOFIELD, C. S. **Cotton root rot in the San Antonio rotations.** *Jour. Agric. Res.* 21³: 117-125. 1921.—Records are presented covering 8 years on the occurrence of root rot of cotton [caused by *Phymatotrichum omnivorum*] in experimental plots in Texas involving continuous cropping and rotations with various crops of 2, 3, and 4 years respectively. The data indicate that "the control of root rot is not to be found through any ordinary system of crop rotation or of tillage methods."—*D. Reddick.*

960. SNAPP, OLIVER I., AND LESLIE PIERCE. **Experiments in dusting and spraying peaches for the control of curculio, brown rot, and scab.** *Mississippi Agric. Exp. Sta. Bull.* 195. 8p., 1 *fig.* 1920.—Liquid sprays gave slightly better results than dust but required more labor in applying. Dust (lead arsenate 10 per cent, lime 10 per cent, and sulphur 80 per cent) applied on April 22, May 11, and June 12 controlled brown rot and scab effectively but did not control the curculio, as 19.8 per cent of the fruit produced was wormy.—*H. B. Brown.*

961. ZUNDEL, GEORGE L. **Preliminary experiments on injury to wheat from seed treatment in Washington.** [Abstract.] *Phytopathology* 11: 103. 1921.—Both copper sulphate solution (1 pound to 5 gallons) and formaldehyde solution (1 to 40) injured seed wheat. The injury was greatly reduced when such treatment was followed by dipping the seed 3-5 minutes in lime solution.—*B. B. Higgins.*

MISCELLANEOUS (TECHNIQUE, COGNATE RESEARCHES)

962. G., C. G. [Rev. of: CHITTENDEN, F. J. **The garden doctor: plants in health and disease.** *x + 154 p.* Country Life: London; Chas. Scribner's Sons: New York, 1920.] *Nature* 107: 40. 1921.

963. HESLER, L. R. [Rev. of: SMITH, ERWIN F. **An introduction to bacterial diseases of plants.** *xxx + 688 p., 453 fig.* W. B. Saunders Co.: Philadelphia and London, 1920.] *Phytopathology* 11: 107-108. 1921.

964. ORTON, C. R. **Lightning injury to potato and cabbage.** *Phytopathology* 11: 96-98. *Fig. 1.* 1921.

965. RATHBUN, ANNIE E. Methods of direct inoculation with damping-off fungi. *Phytopathology* 11: 80-83. *Fig. 1-3.* 1921.—In order to overcome some of the uncertainties encountered in testing the susceptibility of plants to damping-off fungi by placing the organism in the soil, methods of direct inoculation have been devised. By these methods the organism, growing on culture media, is brought into direct contact with the stem, root, or whatever part of the plant seems most desirable for the test.—*B. B. Higgins.*

PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

HEBER W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 633, 658, 661, 664, 728, 936, 956.)

966. BALME, JUAN. Cultivo de la adormidera blanca. [Poppy cultivation.] *Rev. Agric. [Mexico]* 4: 428-429. 1919.—Brief cultural directions for *Papaver somniferum candidum* are given, including methods of harvesting the product and the yields to be expected.—*John A. Stevenson.*

967. BLISS, A. R. Report on alkaloids. *Jour. Assoc. Official Agric. Chem.* 4: 416-420. 1921.—The report deals with strychnine, quinine, physostigmine, hyoscyamine, and others.—*F. M. Schertz.*

968. BUSCHMANN, E. Untersuchungen über die chemischen Bestandteile von *Bulbus Scillae*. [Chemical constituents of *Bulbus Scillae*.] *Arch. der Pharm.* 257: 79-86. 1919.

969. DEHRS, V. Contribution à l'étude du Quebracho rouge. [Contribution to the study of red quebracho.] *Bull. Sci. Pharm.* 28: 48-54. 1921.—The paper, which is an abstract of B. GALARZA's paper from the "L'Institut de Botanique et de Pharmacologie de la Faculté des Sciences Médicales de Buenos Aires," No. 32, 1915, gives a very detailed account of the collecting of the wood of red quebracho (*Schinopsis Lorenzii* and *S. Balensae*), its physical and chemical properties, and its use.—*H. Engelhardt.*

970. DEHRS, V. Étude des Aspidospermées. [Study of the aspidospermae.] *Bull. Sci. Pharm.* 28: 54-61. 1921.—A discussion of EDWIN ROTHLIN's paper, "a contribution to the study of the Aspidospermae," from the Instituto de botanica y farmacologia de Buenos Aires. It deals with the botanical, microscopical, pharmacological, and chemical studies of *Aspidosperma quebracho blanco* and *Aspidosperma peroba*.—*H. Engelhardt.*

971. DIETERLE, H. Xanthosterin, ein krystallinischer Körper aus der Rinde von *Xanthoxylum Budrunga* DC. [Xanthosterin, a crystalline body from the bark of *Xanthoxylum Budrunga*.] *Arch. der Pharm.* 257: 260-263. 1919.

972. FERENEZ, A. Ueber das Kardobenediktenkrautöl. (*Cnicus Benedictus* L.) [Oil of blessed thistle.] *Arch. der Pharm.* 257: 180-190. 1919.—The oil contains 89.80 per cent unsaturated or fluid fatty acids and 3.68 per cent saturated or solid fatty acids. Analysis of the former gave 74 per cent oleic acid and 26 per cent linoleic acid; of the latter 40 per cent stearic acid and 60 per cent palmitic acid. Specific gravity of *Cnicus Benedictus* oil (15°C.) is 0.9262, acid number 1.2, refraction index 1.47178. Other physical and chemical constants are given, and details of separation of the fatty acids.—*H. G. Barbour.*

973. FOCKE, C. Zur künftigen physiologischen Einstellung der officinellen Digitalisblätter. [Physiological testing of digitalis.] *Arch. der Pharm.* 257: 270-288. 1919.—This discussion appears to be of local interest for Germany.—*H. G. Barbour.*

974. FRIEDRICH, O. VON. Ueber einige Inhaltsstoffe der Altheewurzel. [Some constituents of *Althaea* root.] *Arch. der Pharm.* 257: 288-298. 1919.—The content in fatty oil is

1.7 per cent. The latter consists of glycerides of palmitic and oleic acids, also of butyric acid and phytosterin; probably also a high molecular oxy-acid.—The odor of the root is carried by a constituent of unknown composition, non-volatile with steam, soluble in ether but not in petroleum ether.—A lecithin, containing palmitic and oleic acids and choline, is present. The sugar is chiefly cane sugar (10.2 per cent); the invert-sugar content was 0.78 per cent. The gummy portion contains numerous polysaccharides, 64 per cent consisting of glycosan. Galactose is not present (as formerly held), but another saccharocolloid, which yields *d*-galactose on hydrolysis, is present.—*H. G. Barbour.*

975. GADAMER, J. Zur Kenntnis der Chelidonium-Alkaloide. [Chelidonium alkaloids.] Arch. der Pharm. 257: 298–303. 1919.—Studies in stereo-isomerism are presented.—*H. G. Barbour.*

976. GRANT, E. H. Report on balsams and gums. Jour. Assoc. Official Agric. Chem. 4: 421. 1921.—A method is given for the determination of crude fiber in Karaya gum.—*F. M. Schertz.*

977. GREENISH, HENRY G., AND CONSTANCE E. PEARSON. A new source of santonin. Pharm. Jour. 106: 2–3. 1921.—*Artemisia brevifolia*, found abundantly in western Thibet, at an altitude of 9,000–14,000 ft., and in northern India from Kashmir to Kumaon at a somewhat lower altitude, yields at least 1 per cent of santonin. As far as is at present known, santonin is not widely distributed in the genus *Artemisia*. Apart from *A. maritima* var. *Stechmanniana* Besser, the unexpanded flower-heads of which constitute commercial *santonica* and contain from 2 to 3 per cent of santonin, it has been found only in *A. gallica*.—*E. N. Gathercoal.*

978. HARRISON, C. W. The pharmacopoeial assay for alcohols in santal oil extended to include the true acetyl value. Jour. Assoc. Official Agric. Chem. 4: 425–427. 1921.—The method as submitted gives the ratio of the saponification number of the acetylated oil to the acetyl value, and when expressed as santalol furnishes a significant figure for detecting adulterations.—*F. M. Schertz.*

979. HEIDUSCHKA, A., UND K. LÜFT. Das fette Oel der Samen der Nachtkerze (*Oenothera biennis*) und über eine neue Linolensäure. [Fatty oil of evening primrose seed and a new linoleic acid.] Arch. der Pharm. 257: 33–69. 1919.—In 100 gm. of the oil of evening primrose seed the following constituents, expressed in grams, were found: γ -linoleic acid 2.21, α -linoleic acid 33.65, β -linoleic acid 26.67, oleic acid 25.77, palmitic acid and high molecular acids 5.22, caproic acid 0.78, unsaponifiable constituents 2.27. γ -linoleic acid was not previously described; its hexabrom derivative has a melting point of 195–196°C.—*H. G. Barbour.*

980. HERMANN, E. Ein neuer Giftpilz. [A new poisonous fungus.] Pharm. Zentralhalle 61: 511–513. 1920.—Two cases of poisoning could be traced to the eating of a fungus which at first was considered as *Inocybe frumentacea* or *I. sambucina* but later was determined by Romell as *I. lateraria*. The fungus is extremely poisonous, patients dying within 2 hours after previously suffering from vertigo, burning pain in the urinary tract, vomiting, and blindness. Persons who have not eaten a fatal amount of the fungus become blind, but regain eyesight within 24 hours. A detailed description of the structural characteristics of the fungus is given.—*H. Engelhardt.*

981. HOLDERMANN, R. Kirschlorbeerwasser und eine künstliche Darstellungsweise für Aq. Amygdalarum amararum. [Cherry laurel water, and an artificial preparation of water of bitter almonds.] Arch. der Pharm. 257: 69–71. 1921.

982. LUTHER, J. B. The Turner reaction for gurjun balsam. Jour. Assoc. Official Agric. Chem. 4: 422–424. 1921.—A report is presented on the Turner reaction as applied to imports of copaiba to test for the presence of gurjun balsam as an adulterant.—*F. M. Schertz.*

983. McCUTCHEON, ALEXANDER. Cascara sagrada (*Rhamnus Purshianus* DC.) grown in Scotland. Pharm. Jour. 106: 72–73. 1921.—An account is given of the growth of *Rhamnus*

Purshianus seedlings, planted some years ago in East Lothian, Scotland. The plants have not developed into trees, but retain rather the bushy habit of growth. They are now about 9 feet high. Some 2 years ago bark was peeled from a number of branches, dried, and made into the official fluid extract. The latter possessed the full therapeutic value of the best North American *Cascara sagrada*. It would be quite feasible to grow and harvest this drug in Scotland.—*E. N. Gathercoal*.

984. McNAIR, JAMES B. **A study of *Rhus diversiloba* with special reference to its toxicity.** *Amer. Jour. Bot.* 8: 127-146. *Pl. 1, fig. 2.* 1921.—The author discusses the taxonomy of this species, particularly its relationship to *R. toxicodendron*, and outlines the distribution of the species.—The fresh sap emulsion secreted by the resin canals is apparently the only portion of the plant which causes poisoning of the skin (dermatitis). Those parts of the plant which do not possess canals,—the anthers, pollen, xylem, epidermis, cork cells, and trichomes,—are therefore non-toxic. The virulency of the plant in its different growth stages is discussed.—*E. W. Sinnott*.

985. MARSH, C. DWIGHT, A. B. CLAWSON, AND W. W. EGGLESTON. ***Baccharis pteronioides* as a poisonous plant of the Southwest.** *Jour. Amer. Vet. Med. Assoc.* 57: 430-434. *Fig. 1-2.* 1920.—Suspicion has been thrown on *Baccharis pteronioides* as a possible cause of some losses of live stock in the Southwest [U. S. A.]. Feeding experiments have shown the plant to be poisonous to sheep, and it may be presumed that it will affect cattle in a similar way. A short description of the plant is given.—*C. D. Marsh*.

986. PAMMEL, L. H. **Equisetosis or horsetail poisoning.** *Vet. Med.* 16: 43. 1921.—A report is made of a case of horse poisoning, with additional data, mostly from Pammel's manual.—*C. D. Marsh*.

987. PAMMEL, L. H. **Some forms of lima beans poisonous.** *Vet. Med.* 16: 45. 1921.—A distinction is made between lima beans, some varieties of which are poisonous, and butter beans, which are not poisonous.—*C. D. Marsh*.

988. PAMMEL, L. H. **Three-flowered nightshade poisonous.** *Vet. Med.* 16: 46-47. 1921.—An account is given of the fatal poisoning of 2 horses, with details of the symptoms and autopsy findings.—*C. D. Marsh*.

989. PAMMEL, L. H. **Will frosted Sudan grass produce poisoning?** *Amer. Jour. Vet. Med.* 15: 27. 1920.—In reply to this query the author briefly discusses the subject.—*C. D. Marsh*.

990. RAMÍREZ, ROMÁN. ***Drimys mexicana* Sessé et Moc.** *Rev. Agric. [Mexico]* 4: 426. *1 fig.* 1919.—The cultivation of *Drimys mexicana* Sessé et Moc, the bark of which is used for medicine, is discussed.—*John A. Stevenson*.

991. SPOKES, RAY E. **American styrax.** *Jour. Amer. Pharm. Assoc.* 9: 1055-1060. 1920.—A study of American styrax collected in the vicinity of Atlanta. The American styrax was found to be of firmer consistency than the South American product, in this respect resembling European styrax. The author reports the following analyses:

	(a)	(b)	(c)	U. S. P. STANDARD
	<i>per cent</i>	<i>per cent</i>	<i>per cent</i>	
Incineration residue.....	1.4	1.4	1.4	Not more than 1 per cent
Acid value.....	35.0	39.0	37.0	Not more than 86 Not less than 56
Undissolved residue.....	3.0	3.5	3.6	Not more than 2.5 per cent
Cinnamic acid (free).....	12.07	13.84	13.75	<i>Saponification value</i>
Resin esters.....	34.1	35.5		Not more than 230
Styrol.....	1.1	1.6		Not less than 170

The author was unable to isolate styresinol in a seemingly pure state. The volatile oil (1.5-2.0 per cent) obtained by steam distillation has been identified as styrol, $C_6H_5CH:CH_2$, a phenyl substitution product of ethylene and identical to that obtained from Oriental species; it has a boiling point of $145^\circ C.$, sp. gr. of 0.070, and is dextrorotatory $16^\circ 30''$. The author was unable to isolate styrogenin, a white amorphous body, reported to be present in styrax. Methods of collection and range of distribution are given, the latter according to the author extending from Connecticut to southeastern Missouri, south to Tampa Bay, Florida, through Arkansas and Oklahoma to Texas, and then south to Mexico. It is stated that the outlook for larger use of American styrax seems encouraging.—*Anton Hogstad Jr.*

992. VIEHÖEVER, ARNO. Report on medicinal plants. Jour. Assoc. Official Agric. Chem. 4: 409-415. 1921.—The report concerns itself with new sources of supplies or proper substitutes for drugs not now obtainable; value of volume-weight determinations in the analysis of crude drugs and spices; value of micro-sublimation in the analysis of plant products; the condition of domestic and imported drugs.—*F. M. Schertz.*

993. WALLIS, T. E. Analytical microscopy. Pharm. Jour. 106: 48-50. Fig. 1. 1921.—The concluding paper of this series presents counting methods, illustrated by the *Lycopodium* spores and the maize starch procedure, and the preparation of crude fiber for counting.—*E. N. Gathercoal.*

994. WINTERSTEIN, E., UND A. WEINHAGEN. Beiträge zur Kenntnis der Arekaalkaloide: Ueber Guvacin und Isoguvacin. [Areca alkaloids: Guvacin and isoguvacin. Arch. der Pharm. 257: 1-12. 1919.—Chemical isolation of two isomeric bases, $C_8H_9NO_2$, guvacin and isoguvacin, from the strongly concentrated mother liquid of arecolin. Guvacin is said to be Δ^3 tetrahydronicotinic acid. Isoguvacin is possibly a pyrrol derivative.—*H. G. Barbour.*

995. ZÖRNIG-BASEL, H. Beiträge zur Pharmakogeographie. [Pharmaco-geography.] Arch. der Pharm. 257: 129-144. 1919.—An extensive catalogue of commercial products of African and neighboring colonies is presented. Political ownership of these colonies seems to be based on the status in 1913.—*H. G. Barbour.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

CARROLL W. DODGE, *Assistant Editor*

(See also in this issue Entries 599, 610, 634, 686, 694, 700, 794, 801, 815, 817, 824, 866, 871, 872, 883, 908, 909, 911, 919, 928, 964, 974, 975, 1068, 1071)

DIFFUSION, PERMEABILITY, ADSORPTION

996. FITTING, HANS. Untersuchungen über die Aufnahme und über anomale osmotische Koeffizienten von Glycerin und Harnstoff. [Investigations relative to the absorption and the abnormal osmotic coefficients of glycerine and urea.] Jahrb. Wiss. Bot. 59: 1-170. 1919.

997. KNUDSON, L., AND S. GINSBURG. Suggestions with respect to the measurement of osmotic pressure. Amer. Jour. Bot. 8: 164-170. Fig. 1. 1921.—The osmotic concentration of the leaf cells of *Zebrina pendula* and *Iresine Herbstii* was determined both by the cryoscopic and the plasmolytic methods. A piston cylinder for the expression of the cell sap is described. The experiment shows that a pressure of 50,000 lbs. yields a more concentrated sap than does one of 10,000 lbs. The method of freezing the tissue was not found to affect the results greatly. Considerable differences were observed in the osmotic pressure when determined by the plasmolytic and by the cryoscopic methods, the latter giving in every case a higher figure.—*E. W. Sinnott.*

998. KOLKWITZ, R. Die künstliche Zelle. [An artificial cell.] Ber. Deutsch. Bot. Ges. 38: 136-140. Fig. 1. 1920.—The author describes the construction of a new device by which water absorption by osmosis, artificial turgor pressure, and secretion of water as the result of high turgescence may be easily demonstrated. The apparatus consists of (a) a portion which is similar in form to the expanded part of a thistle tube and of about 100 cc. capacity, (b) a glass stopcock, and (c) an approximately cylindrical portion of about 5 cc. capacity into which a tube with an internal diameter of several mm. may be fixed by means of a stopper. The 3 parts of the apparatus are of glass and made in 1 piece. The stopcock connects the narrower end of member "a" with "c," and is so bored that by proper adjustment the chamber of "a" may be made to communicate with the chamber of "c." Either "a" or "c" may be placed in communication with the atmosphere, or the entrance to both chambers may be closed. An animal membrane is stretched across the large open end of "a," and in the demonstration of water secretion the open end of "c" is closed with parchment paper or some vegetable membrane. Directions for the use of the apparatus are given.—R. M. Holman.

999. RUDOLFS, W. Effect of salt solutions having definite osmotic concentration upon absorption by seeds. Soil Sci. 11: 277-293. 2 fig. 1921.—The influence of single salt solutions, varying from 0.001 to 7.0 atmospheres, of calcium nitrate, potassium carbonate, magnesium sulphate, potassium dihydrogen phosphate, sodium chloride, potassium chloride, and sodium nitrate upon water absorption by seeds was determined. Seeds of wheat, corn, watermelon, buckwheat, Canada field pea, white lupine, soybeans, rape, and alfalfa were used. There is a marked difference in the absorbing power of seeds of different species. The highest rates were found in alfalfa, the lowest in corn. Average absorption rates show a linear relation to the osmotic concentration of the solutions, decreasing with increase in concentration except in dilute solutions. The retardation of absorption is accomplished by osmotic action. Low concentrations have a stimulating effect upon the absorption of some seeds but not upon that of others.—W. J. Robbins.

MINERAL NUTRIENTS

1000. HAENSELER, C. M. The effect of salt proportions and concentration on the growth of *Aspergillus niger*. Amer. Jour. Bot. 8: 147-163. Fig. 6. 1921.—*Aspergillus niger* was grown on 3-salt solutions of 3 different total concentrations (0.5, 2.1, and 4.2 atmospheres) and in the presence of sugar. For each total concentration, all possible combinations obtainable by varying the partial concentration of each salt by increments of $\frac{1}{10}$ of the total concentration were made. In certain cases the salts were kept constant and the concentration of the sugar was changed. When the salt proportions were the same, an increase in total concentration gave an increase in the yield of the fungus (dry weight). The partial concentrations of KH_2PO_4 and MgSO_4 were varied within wide limits without in any way affecting the yields. Yield is approximately proportional to the amount of NO_3 present, whether this amount is the result of changes in total or partial concentration. Beyond a certain point, the concentration of sugar is the limiting factor in growth. When salt concentrations and proportions are constant, yield is nearly proportional to the sugar concentration of the nutrient solution.—E. W. Sinnott.

1001. MITCHELL, J. H. Report on inorganic plant constituents. Jour. Assoc. Official Agric. Chem. 4: 391-394. 1921.—Methods are reported for determining calcium, magnesium, and manganese in the presence of large amounts of phosphorus. The method is adapted for use with certain seeds, cereals, and legumes.—F. M. Schertz.

1002. TRUE, RODNEY H. The function of calcium in the nutrition of seedlings. Jour. Amer. Soc. Agron. 13: 91-107. 1921.—The results were obtained by growing seedlings in laboratory cultures. Pure water represents a partial ionic vacuum to roots of plants and tends to establish an equilibrium with the cell contents by the withdrawal of ions from the plant. Injurious action results and is not fully overcome by any pair of ions (salt) tested, but is very

largely overcome by salts yielding the Ca^{++} ion, to a much less degree by those yielding the Mg^{++} ion, and very slightly or not at all by those yielding the K^+ or Na^+ ions. The calcium salts absorbed most abundantly are CaCl_2 , CaCO_3 , and $\text{Ca}(\text{NO}_3)_2$. Absorption of electrolytes is increased by an increase in the number of kinds of nutrient ions present in the solution. When accompanied by Ca^{++} ions, the K^+ ions—neglected when offered in simple solutions—are absorbed. As the variety of ions present in the solution is increased, the importance of rather sharply marked proportional relations becomes distinctly less than in the simpler solutions. The most striking single chemical condition of the solution is the presence of a certain minimal quantity of Ca^{++} ions. A certain minimal quantity of Ca^{++} ions seems to be necessary to secure the normal absorption of the other required ions present in the soil solution. Ca ions evidently make "physiologically available" the other nutrient materials contained in the soil solution. The basis, then, for an understanding of special service performed by the Ca^{++} ion is doubtless to be sought in the physiology of the cell.—*F. M. Schertz.*

PHOTOSYNTHESIS

1003. STERN, KURT. Untersuchungen über Fluorescenz und Zustand des Chlorophylls in lebenden Zellen. [The fluorescence of chlorophyll, and its condition in living cells.] Ber. Deutsch. Bot. Ges. 38: 28-35. 1920.—By means of the spectroscope the author has studied the fluorescence of living cells of *Chlorella* suspended in water and of solutions of chlorophyll in various lipoids. Since fluorescence was observed in the suspension of living cells and in the solutions in lipoids, but never in the colloidal solutions in water, even when various substances were added which might be conceived of as rendering chlorophyll in colloidal solution in the chloroplast fluorescent, he concludes that in the intact green cell the chlorophyll is in true solution in a lipid. He states further that the process of assimilation of carbon dioxide goes on partly in a lipid, partly in a hydroid phase. Surface active substances alter the bounding surfaces of both phases and thus hinder or stop assimilation.—*R. M. Holman.*

1004. WEBER, FRIEDL. Notiz zur Kohlensäureassimilation von *Neottia*. [Carbonic acid assimilation by *Neottia*.] Ber. Deutsch. Bot. Ges. 38: 233-242. 1920.—The author reviews the literature relating to the ability of the brown, also chlorophyll-containing, chromatophores in the cells of the inflorescence of the saprophytic orchid, *Neottia nidus avis*, to assimilate carbon dioxide. Interest in the question has been renewed since WILSCHKE's discovery that the green pigment in question contains only *a*-chlorophyll and none of the *b*-component of ordinary chlorophyll. The negative results of WILLSTÄTTER and STOLL are not considered conclusive by the author of the present paper.—The author found that the starch, which has long been known to be present in the cells of the brown inflorescence, does not disappear when the shoots are kept in the dark for many days; and that plants which have not been exposed to light at any time during their development, although strikingly etiolated and without either chlorophyll or the characteristic brown coloration, are nevertheless rich in starch. *Neottia* chromatophores are without that ability to reduce silver salts in darkness which MOLISCH found in the chloroplasts of all the phanerogams which he investigated, though weak in the case of green orchids and absent in certain diatoms and in *Hydrurus*. These 2 last mentioned groups, according to Wilschke, lack the chlorophyll component *b*. The author's attempts to determine by Engelmann's bacterial method whether oxygen was liberated by illuminated tissue containing chromatophores were not successful. Positive results were secured by the use of reduced indigo carmine solution, but the author believes the question not yet conclusively answered.—*R. M. Holman.*

1005. WILLSTÄTTER, RICHARD, UND ARTHUR STOLL. Untersuchungen über die Assimilation der Kohlensäure. [Investigations of the assimilation of carbon dioxide.] 448 p. Julius Springer: Berlin, 1918.—A collection of seven papers: I. *The constant chlorophyll-content during photosynthesis.* The chlorophyll content of leaves is 0.15 - 0.35 gm. per 100 gm. fresh weight; 0.6 - 1.2 gm. per 100 gm. dry weight, and 0.3 - 0.7 gm. per sq. m. leaf surface. The carotinoids are 0.07 - 0.20 per cent of the dry weight, or 0.03 - 0.07 gm. per sq. m. Normal plants show a constant relation between the chlorophyll components *a* and *b*, designated

$Q \frac{a}{b}$ equal to an average of $2.9 \pm 0.5 - 0.6$. Under natural conditions this relation is not disturbed during photosynthesis. The relation of the 2 carotinoids, $Q \frac{c}{x} = 0.60 \pm 0.1$, also shows but slight variation during photosynthesis. Detailed directions are given for the analytical determination of the chlorophyll components. The quotient $\frac{\text{chlorophyll}}{\text{carotinoid}} = Q \frac{a+b}{c+x}$ varies greatly in different leaves and during the year. In autumn the chlorophyll components decrease while the carotinoids remain, $Q \frac{c}{x}$ varies irregularly, but $Q \frac{a}{b}$ remains about constant.

After long continued photosynthesis, 22 - 67 hours, $Q \frac{a}{b}$ and $Q \frac{a+b}{c+x}$ were but very slightly changed, while $Q \frac{c}{x}$ was shifted in favor of the xanthophyll. An increase in the rate of respiration by raising the temperature to 30 - 37°C. had no effect on $Q \frac{a}{b}$ and $Q \frac{c}{x}$. Photosynthesis at 37 - 45°C. had no effect on the chlorophyll content, but $Q \frac{a}{b}$ was lowered. During

very active photosynthesis, that is, at 30 - 32°C., 5 per cent CO_2 , and light more intense than sunlight, after 6 hours no change in the chlorophyll content was observed.—II. *The relation between photosynthetic activity and the chlorophyll content of leaves.* The complex apparatus and methods used are described, based upon differential determination of CO_2 absorbed in KOH bulbs and weighed. Cut leaves were used and a metal filament electric lamp as the source of the light. "Assimilationszahl" is taken as a measure of photosynthesis and defined as grams of CO_2 fixed per hour per gram of chlorophyll. This varies with the species and with age of leaf used. For 1 molecule of chlorophyll old autumnal leaves of *Ampelopsis quinquefolia* fixed 18 molecules CO_2 and young autumnal leaves of the same plant 164 molecules; in the summer, leaves of *Sambucus nigra* fixed 135 molecules CO_2 , *Sambucus nigra* var. *aurea* 2463; etiolated leaves of *Phaseolus vulgaris* fixed 2736 molecules CO_2 . Experiments with leaves in early spring indicate that the development of pigments and of the photosynthetic machine are not parallel and it is concluded that photosynthesis is dependent not only upon chlorophyll but also upon an internal factor which precedes chlorophyll in the development of the leaf. When yellow autumnal leaves are brought under experimental conditions of maximal photosynthesis (25°C., 5 per cent CO_2 , 48,000 M. C. S.) their activity on the basis of chlorophyll content is about the same as the normal leaf, for the activity of the internal factor has been reduced to about the same extent as the chlorophyll content. The "Assimilationszahl" of the skins of fruits is about the same as that of leaves. The absolute value of the photosynthetic rate is about the same for normal leaves and leaves of varieties poor in chlorophyll, and in the case of *Ulmus*, on the basis of leaf area, the leaves low in chlorophyll have the highest rates. With advancing season chlorophyll content increases while rate of photosynthesis decreases. In the yellow varieties the carotinoids are not higher in actual amount but only in proportion to the chlorophyll. That these yellow pigments play no direct rôle in photosynthesis is shown by the fact that when the violet rays, which are absorbed only by the carotinoids, are removed by means of a potassium bichromate filter, no reduction in the rate was observed. By filtering the light through 1 leaf of *Cucurbita pepo*, the photosynthetic rate of the same species was reduced to 1/20 of that without the filter, and filtered through 2 leaves the rate was zero. A comparative study of etiolated and normal leaves showed remarkably high photosynthesis rates for the former. Etiolated leaves exposed to the light 6-48 hours showed rates which in absolute values were higher than those of normal leaves. Etiolated leaves which had developed but 3-6 per cent of the normal chlorophyll content were able to fix completely their respiration CO_2 . Chlorotic leaves exhibit a very weak photosynthetic activity. Anthocyanin seems to be without influence on photosynthesis. The parasite *Neottia nidus avis* was found to contain chlorophyll, but even at 30°C. and with 5 per cent CO_2 it carried on no photosynthesis. A comparative study, with leaves rich and poor in chlorophyll, of the effects of variations in temperature and light intensity revealed a decided disproportionality between chlorophyll content and photosynthetic

activity and led to the conclusion that in this process there are 2 variable factors: (a) the green pigment, and (b) a factor associated with the protoplasmic activity. The temperature coefficient depends upon the nature of the leaf and is probably variable for different species. Leaves poor in chlorophyll are more dependent upon variations in the light intensity while those rich in chlorophyll show greater variations with temperature.—III. *The absorption of carbon dioxide by the unilluminated leaf.* Leaves absorb CO_2 from a 10 per cent gas mixture. The absorption is independent of the pigment content. The leaf substance absorbs more CO_2 than the water in the leaf. The difference between the absorption by water and by the leaf substance is greater with decreasing partial pressure of CO_2 . Leaves which have been killed and dried and then moistened again absorb CO_2 as do living leaves. The old statement that lecithin absorbs large quantities of CO_2 was found to be entirely erroneous.—IV. *The behavior of chlorophyll toward carbon dioxide.* Chlorophyll in organic solvents does not react with CO_2 , but in colloidal aqueous solutions reaction takes place. CO_2 is absorbed and given off again when the partial pressure of the CO_2 is reduced. It is suggested that there is formed a combination of chlorophyll with performic acid or formaldehydeperoxide which then splits off O_2 . The absorption spectra of colloidal solutions of chlorophyll and of leaves are very similar. At 0°C . the addition of CO_2 to chlorophyll is most effective and decomposition into phaeophytin and MgCO_3 is lower. The aqueous colloidal solutions were allowed to absorb CO_2 and the amounts thus absorbed were determined by (a) passing CO_2 -free air through the solution and determining the CO_2 liberated, (b) taking up in ether and determining the Mg content, (c) adding alcohol to make an 80 per cent solution and drawing off the gas. Each method shows that the CO_2 produces a certain amount of decomposition of chlorophyll. The decomposition of aqueous colloidal chlorophyll solutions can be greatly diminished by the addition of MgCO_3 , and to a lesser degree by the addition of CaCO_3 . These substances as well as gelatin also decrease the rate of addition of CO_2 to chlorophyll. Glycocoll, glucose, and starch exhibit no protective action.—V. *The constant photosynthetic coefficient during augmented photosynthesis.* The value of the photosynthetic coefficient, $\frac{\text{CO}_2}{\text{O}_2}$, for oxalic acid as the first reduction product = 4; for formic acid = 2; for glycollic acid = 1.33 for formaldehyde = 1. The difficulty of separating photosynthetic from respiratory activity has made accurate determination of the photosynthetic coefficient impossible. By sufficiently increasing photosynthetic activity, with high CO_2 content of air (5 per cent) and intense illumination, the inaccuracies incident to determining the respiratory activity become negligible in the determination of the photosynthetic coefficient. In experiments lasting 1–6 hours at $10\text{--}35^\circ\text{C}$. the coefficient was found to equal 1 constantly. In succulents, *Opuntia*, the coefficient equals 0.44 at first and after continued illumination reaches 0.85.—VI. *The dependence of photosynthesis upon small quantities of oxygen.* Removal of O_2 from the atmosphere greatly influences photosynthetic activity. Some species (*Pelargonium zonale*) lose the power to fix CO_2 when kept in an atmosphere of about 0.01 per cent O_2 and do not regain it in the presence of O_2 . Other species, for example, *Cyclamen beropalum*, show slight photosynthesis in such an atmosphere, the rate increasing slowly with continued exposure. The longer the exposure to an O_2 -free atmosphere, the lower is the photosynthesis and the more incomplete is the recovery of the leaf.—VII. *Investigations on the intermediate steps in photosynthesis.* This is a critical discussion of the experiments of others on the formation of CH_2O in the leaf and with chlorophyll preparations. SCHRYVER's experiments were repeated with pure preparations of chlorophyll and no CH_2O was found. Colloidal chlorophyll solutions do not take up CH_2O . The experiments of USHER and PRIESTLY and of CHODAT and SCHWEITZER were repeated with pure colloidal chlorophyll preparations and with and without catalase; CH_2O was never found. Chlorophyll is relatively stable towards O_2 in the light; the first steps in photooxidation do not yield aldehydes nor lower peroxides. These latter substances found by other workers are products of the photooxidation of impurities accompanying the chlorophyll.—H. A. Spoehr.

METABOLISM (GENERAL)

1006. ANDERSON, R. J. Acerin: the globulin of maple seed (*Acer saccharinum*). Jour. Biol. Chem. 46¹: xxxvi. 1921.—The principal protein of the maple seed has been isolated and purified. The name acerin is proposed. It was not obtained in crystalline form, but separated on dialysis in small globular particles. Purified acerin is a nearly white, heavy powder which on combustion leaves no weighable ash.—*G. B. Rigg*.

1007. CLOWES, G. H. A., AND E. BACHMAN. A volatile sperm-stimulating substance derived from marine eggs. Jour. Biol. Chem. 46¹: xxxi. 1921.

1008. COLIN, M. H. L'inuline chez les végétaux, genèse et transformation. [Formation and transformation of inulin in plants.] Rev. Gén. Bot. 31: 75-80, 179-195, 229-250, 277-286. 1919.—A method for the separation of inulin from the other carbohydrates is given. Inulin is formed by the condensation of sugars in the tissues of the root and stem, both glucose and fructose serving as materials for its formation, although hydrolysis yields, of course, only levulose. In the plants studied by the author, inulin appears in special members, as in the fleshy roots of dahlia, and in the subterranean stems of the tuberous sunflower. The tubercles of dahlia at the beginning of their development are rich in saccharose. In some of the plants studied inulin is replaced, at the time of rapid growth, by substances hydrolyzed with extract of yeast. In other cases saccharose appears in such quantities as cause the sap to become dextrorotary.—In the roots and tubercles of some of these plants is found an enzyme which is similar to sucrase of the yeast. It hydrolyzes not only saccharose, but also levulosans of low molecular weight.—*J. M. Brannon*.

1009. COOK, F. C. Composition of tubers, skins and sprouts of three varieties of potatoes. Jour. Agric. Res. 20: 623-635. 1921.—Chemical analyses are furnished of the 3 varieties Rural New Yorker, Green Mountain, and Irish Cobbler.—*D. Reddick*.

1010. ELLIS, N. R., H. STEENBOCK, AND E. B. HART. Some observations on the stability of the antiscorbutic vitamine and its behavior to various treatments. Jour. Biol. Chem. 46: 367-380. 1921.

1011. FELTON, L. D. A colorimetric method for determining the hydrogen ion concentration of small amounts of fluid. Jour. Biol. Chem. 46: 299-305. 1921.

1012. FREUDENBERG, KARL. Neuere Ergebnisse auf dem Gebiete der Gerbstoff-Forschung. [Results of recent investigations on tannin.] Naturwissenschaften 8: 903-907. 1920.—This is a presentation of the recent studies of FISCHER and others on the chemistry of the complicated group of tannic substances. The term tannin covers a large range of substances for which it is difficult to give any general characterization. Freudenberg classifies the tannins into 4 groups, (a) ester tannic substances, (b) catechin and its tannins, (c) tannins of the oak, and (d) ellagentannins.—*Orton L. Clark*.

1013. JORISSEN, A. Recherches sur la cyanogénèse. Une réaction de l'acide citrique. [Investigations on cyanogenesis; a reaction of citric acid.] Bull. Acad. Roy. Belgique, Cl. Sci. 1919: 731-737. 1919.—The author has recently shown that hydrocyanic acid is rapidly formed, in the cold, when very dilute aqueous solutions of citric acid are exposed to diffuse light in the presence of traces of iron compounds and of nitric acid. The reaction occurs under conditions comparable with those in the living cell.—He now gives further precise indications upon this topic of cyanogenesis and also indications concerning the identification of citric acid.—*Henri Micheels*.

1014. MENAUL, P. Note on the formation of hydrocyanic acid in plants. Jour. Biol. Chem. 46: 297. 1921.—Experimental results indicate that prussic acid may be formed in plants by the action of formaldehyde on nitrates.—*G. B. Rigg*.

1015. NESTLER, A. **Zur Kenntnis des Rhinanthocyans.** [Rhinanthocyan.] Ber. Deutsch. Bot. Ges. 38: 117-121. 1920.—The author gives an account of various methods which he employed in extracting and splitting the glucoside, rhinanthin, which is responsible for the production of so-called blue bread from flour made from grain which contains seeds of *Alectorolophus hirsutus*, *Melampyrum arvense*, and other rhinanthin-containing seeds. In the author's experiments the glucoside was secured from the former of the 2 plants mentioned. The blue color of the alcohol-hydrochloric acid extract of the seeds, which is due to the splitting by the acid of the rhinanthin into rhinanthocyan and sugar, changes to orange red or red brown upon addition of potassium or sodium hydroxide. The blue color does not return after subsequent addition of acid. Hydrochloric acid splits the rhinanthin more effectively than sulphuric acid, and the decomposition is also brought about by oxalic, citric, lactic, and acetic acids. In the case of blue-bread production, lactic acid rather than acetic acid is responsible for the splitting, since the acetic acid is relatively weak in its ability to bring about the reaction. Good extraction media are 70 per cent alcohol plus 5 per cent hydrochloric acid, hot alcohol, and hydrochloric acid in distilled water. The colored solution of rhinanthocyan, however secured, undergoes alteration on standing. The color secured by extraction of the seeds with a medium containing acid, and also the green color of chloroform shaken with the colored extract, disappear when these liquids are passed through the ultrafilter of Wolfgang Ostwald.—R. M. Holman.

1016. PETERSON, W. H., AND HELEN CHURCHILL. **The carbohydrate content of the navy bean.** Jour. Amer. Chem. Soc. 43: 1180-1185. 1921.—The completeness of the digestion of the carbohydrates of legumes by malt diastase is enhanced by fine grinding. Such interfering substances as cellulose or protein are broken up and starch is exposed to the action of the enzyme. The authors found the iodine test extremely sensitive to small amounts of starch, but they also conclude that substances other than starch might give the iodine test.—J. M. Brannon.

1017. PETERSON, W. H., E. B. FRED, AND J. H. VERHULST. **The destruction of pentosans in the formation of silage.** Jour. Biol. Chem. 46: 329-338. 1921.—The corn fodder examined contained an average of 21.8 per cent of pentosans. During fermentation some of the pentosans were destroyed. Pentoses or other furfural-yielding substances, soluble in water, were present in the silage throughout the fermentation. The production of these substances is probably due to the action of microorganisms.—G. B. Rigg.

1018. SHAFFER, P. A., AND A. F. HARTMANN. **The iodometric determination of copper and its use in sugar analysis. I. Equilibria in the reaction between copper sulphate and potassium iodide. II. Methods for the determination of reducing sugars in blood, urine, milk and other solutions.** Jour. Biol. Chem. 45: 349-364, 365-390. 1921.

1019. SHAW, R. H., AND P. A. WRIGHT. **A comparative study of the composition of the sunflower and corn plants at different stages of growth.** Jour. Agric. Res. 20: 787-792. 1921.—Chemical composition of sunflower (*Helianthus*) and corn (*Zea mays*) at the silage stage differs principally in the amount and character of the carbohydrates. Tables of analyses are given showing total protein, albuminoid protein, reducing sugars, non-reducing sugars, and starch at several different stages of development.—D. Reddick.

1020. TOTTINGHAM, W. E., R. H. ROBERTS, AND S. LEPKOVSKY. **Hemicellulose of apple wood.** Jour. Biol. Chem. 45: 407-414. 1921.—Analysis of apple wood from fruiting branches shows a high content of the acid-hydrolyzable material commonly designated as hemicellulose. The alcohol-soluble fraction resulting from partial hydrolysis of this material has been found to contain large amounts of xylose and glucose, with a little galactose. It is suggested that this hydrolyzable material forms a reserve source of carbohydrate in the metabolism of the apple tree.—G. B. Rigg.

METABOLISM (NITROGEN RELATIONS)

1021. BEJERINCK, M. W. Chemosynthese bij denitrificatie met zwavel als energie. [Chemosynthesis and denitrification with sulphur as a source of energy.] Verslag. K. Akad. Wetenschappen Amsterdam 29: 845-856. 1920.

1022. BREWSTER, J. F. The use of edestin in determining the proteolytic activity of pepsin. Jour. Biol. Chem. 46: 119-127. 1921.—A method for the preparation of standard edestin from hemp seed is given, and also a method for the assay of pepsin based on the use of this standard preparation.—*G. B. Rigg.*

1023. COHN, E. J. A physicochemical method of characterizing proteins. II. Jour. Biol. Chem. 46¹: iii-iv. 1921.—Glutenin and serum globulin are precipitated as undissociated molecules at their isoelectric point. Experimental evidence suggests that there is a physicochemical basis for our present classification of simple proteins.—*G. B. Rigg.*

1024. JOHNS, C. O., AND C. E. P. GERSDORFF. The proteins of the tomato seed, *Solanum esculentum*. Jour. Biol. Chem. 46¹: xxvi. 1921.—A 4 per cent aqueous solution of sodium chloride extracts the maximum amount of protein. Two globulins, both high in sulphur, were found.—*G. B. Rigg.*

1025. JOHNS, C. O., AND H. C. WATERMAN. Conphaseolin: a new globulin from the navy bean. Jour. Biol. Chem. 46¹: xlv. 1921.

1026. MILLER, HARRY G. Distribution of nitrogen in the alfalfa seed. Jour. Amer. Chem. Soc. 43: 906-914. 1921.

METABOLISM (ENZYMES, FERMENTATION)

1027. FRED, E. B., W. H. PETERSON, AND J. A. ANDERSON. The relation of lactic acid bacteria to corn silage. Jour. Biol. Chem. 46: 319-327. 1921.—Organisms of the *Lactobacillus pentoaceticus* type play an important part in the chemical changes produced. They are present throughout the fermentation, and in the last stages are the predominant type. Organisms of the *Bacillus lactis acidi* type persist and act only during the first days of the fermentation. The production of alcohol is undoubtedly due in part to the action of the pentose-fermenting type.—*G. B. Rigg.*

ORGANISM AS A WHOLE

1028. DALE, H. H. The biological significance of anaphylaxis. Proc. Roy. Soc. London B. 91: 126-147. 1920.

1029. FUNK, GEORG. Ueber das Verhalten der *Oscillatoria amphibia* Ag. im Kolonie-Verband. [The behavior of *Oscillatoria amphibia* Ag. in colony-union.] Ber. Deutsch. Bot. Ges. 38: 267-274. Fig. 1. 1920.—The author explains methods of obtaining relatively pure cultures of the organism for experimentation. He observes the movements due to causes residing within the organisms themselves when the cultures are placed, in varying quantities, in Petri dishes and in glass tubes filled, sealed, and laid horizontally. He also reports their behavior when stimulated by external agencies, for example, light, heat, and electricity. Further experimentation is in progress with a view to determining the causes of reactions.—*N. L. Gardner.*

1030. JOSHIA, N. V. Studies on the root nodule organism of the leguminous plants. Mem. Dept. Agric. India Bact. Ser. 1: 247-276. 1920.—The cross inoculation experiments made indicate that there is only a single species of the legume nodule organism, when nitrogen fixation and stimulation are taken as the criteria. Where inoculation did not lead to nodule formation the plants were still found to derive benefit from the nitrogen fixed by the micro-organism. The root-nodule organism was found to exert a beneficial influence on gramina-

ceous as well as leguminous plants. Benefit was derived by plants in a pot when the micro-organism was grown in a porous cylinder placed in the center of the pot. Inoculation with *Azotobacter* gives similar results to those obtained with the nodule organism when the latter does not bring about nodule formation.—*J. J. Skinner*.

1031. MACDONALD, MARGARET, AND E. V. MCCOLLUM. The cultivation of yeast in solutions of purified nutrients. *Jour. Biol. Chem.* 45: 307-311. 1921.—Experiments indicate that yeast either grows in the absence of any special growth-promoting substance or that it synthesizes the substance to meet its own needs.—*G. B. Rigg*.

1032. NELSON, V. E., E. I. FULMER, AND RUTH CESSNA. The nutritional requirements of yeast. III. The synthesis of water-soluble B by yeast. *Jour. Biol. Chem.* 46: 77-81. 1921.—Yeast can synthesize water-soluble B.—*G. B. Rigg*.

1033. PEARL, RAYMOND. The biology of death. II. Conditions of cellular immortality. *Sci. Monthly* 12: 321-335. *Fig. 1-6*. 1921.—The work of JACQUES LOEB on artificial parthenogenesis, FRANK R. LILLIE's work on fertilization, LEO LOEB's successful cultures of somatic cells and tissues outside of the body, HARRISON and BURROW's improved technique in this same field, and CARREL's work with adult tissue of mammals, actual growth and development of new cells and new individuals in vitro secured by H. V. WILSON, Dr. and Mrs. W. H. LEWIS's discovery that growth takes place in tissues outside of the body in inorganic solutions, Carrel's success in keeping cells alive longer than the normal life of these (with the promise of indefinite continuation of the same),—these all lead to the conclusion that the essential tissues of the metazoan body are potentially immortal. Senescence is to be regarded as an attribute of the multicellular body as a whole and not a primary attribute of the physiological economy of cells as such. It shows that purely cytological methods are not suitable for investigating causes of senescence.—*L. Pace*.

1034. PEARL, RAYMOND. The biology of death. *Sci. Monthly* 12: 444-447. 1921.—This article continues the discussion of this subject, giving tables showing chances of life or death of different periods, and ages of the individual, with an analysis of these data.—*L. Pace*.

1035. WILLIAMS, R. J. Vitamines and yeast growth. *Jour. Biol. Chem.* 46: 113-118. 1921.—Bakers' yeast and brewers' yeast were used. The growth of each is stimulated more by its own extract than by that of the other. This is interpreted to mean that there is some specificity in growth stimulants, but not necessarily 2 totally different substances stimulating the growth of the 2 varieties. Some results present the possibility that the antiscorbutic vitamine, as a secondary factor, may stimulate yeast growth.—*G. B. Rigg*.

GROWTH, DEVELOPMENT, REPRODUCTION

1036. BRANNON, J. M. A simple method for growing plants. *Amer. Jour. Bot.* 8: 176-178. *Fig. 1*. 1921.—The author has grown plants successfully when completely immersed in sterilized and sealed culture solutions containing sugar and mineral salts. Flax, alfalfa, corn, peas, and timothy may be readily grown in this way and thrive better than in agar or in the ordinary water culture. The author points out the particular advantage of this method when plants are to be grown in the dark.—*E. W. Sinnott*.

1037. HARRIS, J. A., AND H. S. REED. Inter-periodic correlation in the analysis of growth. *Biol. Bull. [Woods Hole]* 40: 243-258. *2 fig.* 1921.—From a series of data collected by one of the authors the attempt is made to illustrate the application of inter-periodic correlation coefficients to the problem of growth. In the discussion the following terms are used and defined. Growth stage is the time at which a series of organisms is measured. Growth period is the time elapsing between the *s*th and the *s*+*n*th growth stage, and the growth increment is the increase in size during such period. The relative growth increment

is the ratio of the growth increment to the absolute size of the individual at a given stage. Three problems were under consideration, namely: (1) The correlation between the absolute size of an organism at its several periods of development; (2) the correlation between the growth increments of the organism during the several growth periods; (3) the correlation between the absolute size of the organism at given stages of development and subsequent growth increments. A discussion of each problem follows. *Helianthus* plants were used for study. The general results show that the actual size of an individual at any stage of development is closely correlated with its size at other closely correlated stages of development but rapidly diminishes as the growth stages become widely separated. Also the ultimate size of an organism is only slightly determined by its initial size. The correlation between successive growth increments is positive in sign and has the general average of .501. The correlation for increments of weekly periods separated by an interval of 1 week is about .225. The correlation between growth increments more widely separated is on the average negative in sign. Plants which grow rapidly during a certain stage of development will grow more rapidly during a closely associated period, but widely separated periods have little or no relationship between the growth increments. The growth increment is positively correlated with its size at an immediately preceding stage. In the early stages the growth increments of 2 or 3 subsequent periods during the early stages of growth are positively correlated with the initial size of the organism.—*T. J. Fitzpatrick.*

1038. REED, HOWARD S. Growth and sap concentration. Jour. Agric. Res. 21: 81-98. 7 fig. 1921.—Material for the investigation consisted of walnut (*Juglans*) and apricot (*Prunus armeniaca*) trees, both in their 2nd year of growth, and of new shoots of orange (*Citrus*).—The 2 variables, growth and concentration of sap, vary in opposite directions. As the season advances the concentration of sap increases and, in apricot, continues to increase after active growth ceases. This is largely a matter of the accumulation of solutes, although diminished absorption of water may be responsible in part. Addition of water to the soil usually results in a diminution of sap concentration. This is the only one of the external factors considered that seems to affect concentration. Sap concentration of shoots on heavily pruned trees is lower than that of shoots from unpruned trees. A concentration gradient exists in the shoots, the concentration of sap at the tips being greater than at the base of shoots. Low concentrations of sap in the shoot as a whole appear to be associated with abundant water intake and rapid vegetative growth, while higher concentrations are associated with slow growth and fruit-bud formation. Summer pruning of fruit trees is not only unnecessary but may be detrimental.—*D. Reddick.*

1039. SCHÜEPP, OTTO. Über Form und Darstellung der Wachstumskurven. [The form and representation of growth curves.] Ber. Deutsch. Bot. Ges. 38: 193-199. 1920.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1040. OEHLKERS, FRIEDRICH. Zur reizphysiologischen Analyse der post-floralen Krümmungen des Blütenstiels von *Tropaeolum majus*. [An analysis of the post-floral curvatures of the peduncle of *Tropaeolum majus*.] Ber. Deutsch. Bot. Ges. 38: 79-83. 1920.—This is a preliminary report. The curvatures in question begin about 12 hours after the pollination of the protandrous flowers. First, the apical zone of the peduncle, beginning just below the ovary, bends through about 90°. The second curvature, in a 3-5 cm. zone, below the region of the first curvature, occurs within the next 24 hours; and this curvature may amount to as much as 270°, generally lessened somewhat by a slight counter reaction. Finally, about the time of the ripening of the seeds, a short zone at the base and in the axil of the subtending leaf curves in the same direction as the above. By experiments with peduncles detached from the plant and subjected to unilateral illumination, by rotation upon the clinostat, and by retention in the dark room, the author has attempted to find an explanation for the first 2 curvatures and for the variations which sometimes occur in the reactions of plants growing outdoors. His principal conclusions are that the post-floral curvatures represent a combined sensitive reaction which can be accounted for only on the basis of a change of

tonus, which does not depend on the fertilization of the flower. Fertilization is related to the reaction only in that it induces renewed growth. The reactions are geotropically positive and phototropically negative, they are dorsiventral, and dissimilar curvatures result from the stimulus of gravity or light alone. The normal curvature is the resultant of the geotropic and the phototropic reactions. The striking over-curvature is due to the fact that the post-floral growth progresses from the free end to the fixed base and the curvature does not displace the zone which is still capable of growth and reaction from the position of stimulation. The counter reaction is slight because the growth period is short and the reaction time very long.—*R. M. Holman.*

1041. ZOLLIKOFER, CLARA. Ueber die tropistische Wirkung von rotem Licht auf Dunkelpflanzen von *Avena sativa*. [Tropic action of red light on etiolated plants of *Avena sativa*.] Verslag. K. Akad. Wetenschappen Amsterdam 29: 551-558. 1 fig. 1920.—Experiments were conducted in a darkroom under the influence of a 100 candle-power light, surrounded by very dark ruby glass which was spectroscopically tested, the room having a constant temperature of 22.5°C. and a moisture content of 55 to 60 per cent. All reactions showed a remarkable uniformity at any definite light intensity. The lowest light intensity at which any observable phototropic action occurred was between 15 and 30 M. C. S.—*J. C. Th. Uphof.*

RADIANT ENERGY RELATIONS

1042. DISHOEK, A. F. C. VAN. Gevoeligheid voor licht van + en - stammen van *Phycomyces nitens*. [Light sensitiveness of "plus" and "minus" strains of *Phycomyces nitens*.] Verslag. K. Akad. Wetenschappen Amsterdam 29: 667-669. 1920.—In phototropic experiments with *Phycomyces nitens* the various strains do not give the same results. With one-sided illumination the sporophores of the minus strains were strongly directed toward the light, the plus strain slightly. Other observations as to light sensitiveness are given.—*J. C. Th. Uphof.*

1043. MEYER, FRITZ J. Die Licht Physiologie der Pflanzen. [The light physiology of plants.] Naturwissenschaften 8: 842-851. 5 fig. 1920.—This is a critical presentation of the results of important papers of recent years dealing with (a) light and germination, (b) light and growth, (c) light and assimilation, (d) the lethal effect of ultraviolet rays, and (e) light and plant movements.—*O. L. Clark.*

TOXIC AGENTS

1044. ATWOOD, W. M. Physiological studies of the effects of formaldehyde on wheat. [Abstract.] Phytopathology 11: 103. 1921.

1045. SEELIGER, RUD. Über einige physiologische Wirkungen des Osmium tetroxyds. [Some physiological effects of osmium tetroxide.] Ber. Deutsch. Bot. Ges. 38: 176-184. 1920.—Grains of wheat kept for 8 hours in $\frac{1}{2}$ to $\frac{1}{4}$ per cent solutions of osmium tetroxide subsequently showed 100 per cent germination. Some germinated even after similar treatment with 1 per cent solution. The harmful effect of the tetroxide was evident in the slower germination of the wheat, in the slower growth of the seedlings, and in a permanent dwarfing of the plants.—*R. M. Holman.*

SOIL SCIENCE

J. J. SKINNER, *Editor*

F. M. SCHERTZ, *Assistant Editor*

(See also in this issue Entries 585, 588, 589, 590, 595, 596, 604, 605, 606, 616, 620, 638, 682, 790, 820, 1030)

GENERAL

1046. BOUYOUCOS, GEORGE. The amount of unfree water in soils at different moisture contents. Soil Sci. 11: 255-259. 1921.—By the use of the dilatometer the amount of unfree

water in 12 soils at 5 or 6 different water contents was determined. The amount of unfree water in a given soil does not vary with the water content but appears to remain constant.—*W. J. Robbins.*

1047. GARDNER, WILLARD, AND JOHN H. WIDTSOE. The movement of soil moisture. *Soil Sci.* 11: 215-232. 11 fig. 1921.—A mathematical discussion of the movement of water through soil.—*W. J. Robbins.*

1048. GUTHRIE, F. B., A. A. RAMSEY, R. M. PETRIE, AND F. J. STOKES. List of fertilizers in New South Wales. *Agric. Gaz. New South Wales* 32: 277-284. 1921.—A list is given showing the composition of fertilizers on the market.—*L. R. Waldron.*

1049. HOWARD, ALBERT. Investigaciones recientes sobre o arejamento dos solos. [Recent investigations on the aeration of soils.] *Bol. Agric. [Nova Goa, Portuguese East India]* 1: 254-264. 1919.—Translation of a paper given before the Indian Congress of Science, 1919.—*John A. Stevenson.*

1050. JURITZ, CHAS. F. Calcium cyanamide. Its agricultural use as a fertilizer. *Jour. Dept. Agric. Union of South Africa* 1: 765-769. 1920.—A discussion of calcium cyanamide is presented, including manufacture and agricultural uses. A review of the literature showing its comparative value and cautions to be observed in its use is given.—*Lyman Carrier.*

1051. JURITZ, CHAS. F. Wheat straw and its value to the land. *Jour. Dept. Agric. Union of South Africa* 1: 712-717. 1920.—The disposal of wheat straw in the various districts of the South African Union is discussed. The value of the material as a fertilizer is discussed, and chemical analyses are given. The utilization of all wheat straw as fertilizer is recommended, by applying either directly to the soil or indirectly by feeding to animals, or using as a litter and then applying the manure to the land.—*Lyman Carrier.*

1052. KAZAKOV, A. Znachenie Viatskikh fosforitnykh zalezhei v dele podniatiia zemledellia v Rossii. [Importance of the Viatka phosphate deposits.] *Narodnoe Khoziaistvo [Moscow]* 1920: 66-68. 1920.—A systematic survey of the last 2 years has shown that the Viatka phosphate deposits, from a commercial point of view, are superior even to the world-famous South Carolina deposits. While being equal to the latter in its quality and in conditions of exploitation, the Viatka or Kama layer is twice as thick as the Carolina layer. There are enormous quantities of cheap fuel (wood) in the vicinity and it is the only deposit in European Russia that permits exploitation by the open method with an extensive application of powerful machinery.—*M. Shapovalov.*

1053. KEEN, B. A. The physical investigation of soil. *Sci. Prog. [London]* 15: 574-589. 1921.—A general review of the subject of soil physics together with its relation to agriculture is given under the following heads: (1) The dimensions of the individual particles and the manner of their arrangement, (2) soil moisture, (3) soil temperature, and (4) soil atmosphere.—*J. L. Weimer.*

1054. LIPMAN, C. B. Report on soils. *Jour. Assoc. Official Agric. Chem.* 4: 388-389. 1921.—A report is presented of progress in determining phosphorus in soils.—*F. M. Schertz.*

1055. McCALL, A. G. The effect of manure-sulphur composts upon the solubility of the potassium of greensand. *Jour. Assoc. Official Agric. Chem.* 4: 375-376. 1921.—The potassium of greensand was made water soluble through sulphofication, the most effective compost containing sulphur and manure in equal amounts. When part of the manure was replaced by soil, sulphofication was reduced and consequently less potash was rendered water-soluble; while if all of the manure was replaced by soil only a very small amount of potash was found in the water extract. A greater total amount of water-soluble potash was recovered in the composts containing high-potassium greensand, but a greater percentage of total potassium

was liberated from the low-potassium greensand. In composts containing manure the total amounts of potash recovered in the water extracts varied from 9.1 to a maximum of 41.3 per cent of the total initial amount present.—*F. M. Schertz.*

1056. MCCOOL, M. M., AND L. C. WHITING. Some studies on the rate of formation of soluble substances in several organic soils. *Soil Sci.* 11: 233-247. 4 fig. 1921.—By means of the freezing point method the rate of formation of soluble material was determined in 7 organic soils under different moisture and temperature conditions and at different depths. At any given moisture content, higher temperatures tend to bring more material into solution and lower temperatures decrease the rate of formation. In general, the ability to yield soluble materials decreased regularly from the surface to the water-table. The zone of weathering and the region of greatest activity closely coincide.—*W. J. Robbins.*

1057. MACINTIRE, W. H., AND C. A. MOOERS. A pitless lysimeter equipment. *Soil Sci.* 11: 207-213. Pl. 1-2, fig. 1. 1921.—A lysimeter system not requiring a concrete enclosure and costing \$500 for a 12-unit system is figured and described. It consists essentially of a pair of cylindrical iron tanks, the inner of which holds the soil. Arrangements are made for removing the leachings from the outer tank by means of a pump.—*W. J. Robbins.*

1058. MACINTIRE, W. H., F. J. GRAY, AND W. M. SHAW. The non-biological oxidation of elemental sulphur in quartz media. *Soil Sci.* 11: 249-259. 1921.—Elemental sulphur will oxidize upon moist contact with relatively pure quartz under both aerobic and CO₂ anaerobic conditions. Metallic iron depresses the oxidation, limonite accelerates it. Several carbonates under aerobic conditions increase the oxidation. Elemental sulphur may be oxidized to sulphates in a silicious medium solely by chemical reactions.—*W. J. Robbins.*

1059. PETERSON, ALVAR. Some soil fumigation experiments with paradichlorobenzene for the control of the peach tree borer, *Sanninoidea exitosa* Say. *Soil Sci.* 11: 305-319. Pl. 1, 1 fig. 1921.—If the soil temperature is 55-60°F. and the soil not too wet, $\frac{3}{4}$ to 1 oz. of paradichlorobenzene will kill 90-100 per cent of the peach-tree borers. It can be safely applied to trees 6 years of age or older. It should be placed in a narrow band about the base of the tree approximately 2 inches from the trunk. The material should be covered with several shovels of soil.—*W. J. Robbins.*

1060. ROST, CLAYTON O., AND FREDERICK J. ALWAY. Minnesota glacial soil studies I. A comparison of soils on the late Wisconsin and Iowan drifts. *Soil Sci.* 11: 161-205. Pl. 1-3, 7 fig. 1921.—A comparison was made of the physical and chemical composition of 3 soil types occurring on 2 adjacent drifts of similar original till but of different geologic age. No distinct differences between the 2 drifts were found in texture, or content of silicon, aluminum, potassium, sodium, magnesium, non-carbonate lime, nitrogen, or organic carbon. The soils on the older drift are considerably richer in phosphoric acid and contain appreciably more iron and titanium. It would appear that the only distinct influence which the greater age of the Iowan drift has been able to exert upon the soils developed upon it is confined to the leaching out of carbonates to a greater depth and an enrichment of the surface layers in phosphoric acid.—*W. J. Robbins.*

1061. STEWART, GUY R. The effect of continuous cropping upon the major soil nutrients. *Soil Sci.* 11: 321-323. 1921.—Two sets of soils in containers holding 1800 lbs., 1 set very similar and consisting of 6 clay loams, the other dissimilar and consisting of 7 fine sandy loams, have been cropped continuously for 6 seasons. The average decrease in crop yield amounts to 35.2 per cent for the straw and 34.4 per cent for the grain. In 5 of the 7 sandy loams there has been a reduction of 30 per cent or more of the soluble phosphates while only 2 of the clay loams have begun to show a decrease. Determinations before the soils were planted showed that the fine sandy loams contained 0.05-0.09 per cent, the silty clay 0.13-0.18 per cent of total nitrogen. At the close of 1919 all the soils, both planted and fallow, showed a reduction of 14-38 per cent of their original total nitrogen content.—*W. J. Robbins.*

1062. WYANT, ZAE NORTHROP. A comparison of the technic recommended by various authors for quantitative bacteriological analysis of soil. *Soil Sci.* 11: 295-303 1921.—A study of the literature and analysis of the methods found there for the quantitative bacteriological analysis of soil are presented.—*W. J. Robbins.*

LIME STUDIES

1063. HARTWELL, BURT L. Need for lime as indicated by relative toxicity of acid soil conditions to different crops. *Jour. Amer. Soc. Agron.* 13: 108-112. 1921.—The kind of plant to be grown determines, more than any other factor, the amount of lime to apply to the soil.—*F. M. Schertz.*

1064. MACINTIRE, W. H. Report on the lime absorption coefficient of soils. *Jour. Assoc. Official Agric. Chem.* 4: 389-390. 1921.—The author recommends the Jones method, as follows: To 5.6 gm. of soil add 0.5 gm. of calcium acetate (tested reagent), place in a mortar and mix; add water to make a fairly stiff paste. Pestle for 20 seconds, add 30 cc. of water, and continue the mixing for 30 seconds. Wash into a 200 cc. flask and keep the bulk down to about 160 cc. Let stand, with occasional shaking, for 15 minutes. Make up to a bulk of 200 cc., mix, and filter through a dry filter. Discard the first 10-15 cc., which may be cloudy; a Büchner funnel is recommended for filtering. Titrate 100 cc. of the clear filtrate, using phenolphthalein as an indicator, with N/10 NaOH. This reading multiplied by 2 gives the number of cc. of N/10 alkali required to neutralize the acetic acid in 200 cc. of the solution. This figure times the factor 1.8 times 1000 indicates the pounds of CaO required per 2,000,000 pounds of soil.—*F. M. Schertz.*

1065. PIPER, C. V. The symposium on liming. *Jour. Amer. Soc. Agron.* 13: 89-90. 1921.—A brief synopsis of definitely known facts and the more or less controversial problems in regard to the agricultural use of lime.—*F. M. Schertz.*

1066. SCHOLLENBERGER, C. J. Lime requirements and reaction of lime materials with soil. *Soil Sci.* 11: 261-276. 1921.—Various lime materials were mixed with soil in undrained pots and at intervals the residual carbonate, accumulated nitrate, and lime requirement were determined. Caustic lime was most reactive followed by precipitated calcium carbonate and "dicalcium silicate"; high-calcium limestone, calcite, and magnesite; natural carbonate dolomite; and blast furnace slag. The interaction of soil constituents and calcium carbonate is sufficiently regular and quantitative to show the lime requirement based upon the reaction. The preparation of the sample, temperature, and time allowed for the determination are of considerable importance. Heating is not undesirable in a perfect lime-requirement test.—*W. J. Robbins.*

1067. WORTH, F. G., AND PO SAW MAUNG. Absorption of lime by soils. *Mem. Dept. Agric. India Chem. Ser.* 5: 157-171. 1919.—The lime-absorbing power of a number of local soils was studied by the addition of a measured amount of calcium bicarbonate to a weighed amount of soil, the mixture digested for 6 hours, then filtered and titrated. A theoretical discussion of the results is given.—*J. J. Skinner.*

PEAT

1068. AIYER, P. A. SUBRAMANIA. The gasses of swamp rice soils. Part V. A methane-oxidizing bacterium from rice soils. *Mem. Dept. Agric. India Chem. Ser.* 5: 173-180. 1920.—The oxidation of methane in paddy rice soils is caused by the bacterium *B. fluorescens liquefaciens*. Organic matter interferes with the bacterium; the oxidation proceeds in purely mineral media.—*J. J. Skinner.*

1069. ALWAY, F. J. Experimental work on Minnesota peat soils. *Jour. Amer. Peat Soc.* 14: 40-47. 1921.

1070. BEATTIE, J. H. Truck growing on muck in the Kankakee marsh of northern Indiana. *Jour. Amer. Peat Soc.* 14: 32-39. 1921.—Onions, cabbage, and celery were grown. Applica-

tions of nitrate of soda, tankage, acid phosphate, and lime had very little effect. The application of potash salts, particularly muriate, and manure gave marked increases.—*G. B. Rigg.*

1071. BOTTOMLEY, W. B. Treatment of peat. Jour. Amer. Peat Soc. 14: 56. 1921.—Canadian patent 206,416 covers a method of producing auxinomes (growth-promoting substances) in peat.—*G. B. Rigg.*

1072. HARRISON, W. H. The gases of swamp rice soils, part VI. Carbon dioxide and hydrogen in relation to rice soils. Mem. Dept. Agric. India Chem. Ser. 5: 181-194. 1920.—Carbon dioxide and H do not exist in association in paddy rice soils. Carbon dioxide is apparently reduced by H as fast as it is formed, resulting in the formation of marsh gas and organic matter. This reaction is said to be an important factor in the conservation of the oxygen, which remains available for root aeration.—*J. J. Skinner.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 848, 874, 984)

GENERAL

1073. BRITTON, N. L. Investigations of the flora of northern South America. Science 53: 29. 1921.—In 1918 a cooperative effort was made by the New York Botanical Garden, the United States National Museum, and the Gray Herbarium to investigate the botany and plant products of northern South America. The investigation has made good progress through the study of specimens already obtained in Dutch and British Guiana, Trinidad, Tobago, Venezuela, Curaçao, Colombia, and Ecuador. This undertaking has been furthered by the heartiest cooperation on the part of leading men in the countries concerned. A wealth of material hitherto unknown to science has already been identified, and many facts are being added to our knowledge of the flora and its geographic distribution.—*A. H. Chivers.*

1074. HU, HSIEN SU. The botanical names of Chekiang plants.] Ko-Hsueh [Science-Publ. Chinese Sci. Soc.] 6: 70-101. 1921.—A list of botanical names for 302 species of vascular plants collected in the province of Chekiang is presented with the equivalent Chinese names in characters. The name of the locality where each plant was collected is also indicated in the list.—*Chunjen C. Chen.*

1075. NAKAI, TAKENOSHIN. Notulae ad Plantas Japoniae et Koreae, XXIII. [Notes on the plants of Japan and Korea XXIII.] Bot. Mag. Tôkyô 34: 141-158. 1920.—Two new genera, *Crepidiastrum* (Compositae) and *Paraixeris* (Compositae), and the following new species, varieties, and combinations are made: *Dryopteris oligophlebia* var. *lasiocarpa* (Hayata) and *D. purpurascens* (Blume), *Eria bidentata*, *Eulophia Toyoshimae*, *Stachyurus Matsuzakii*, *Stellera rosea*, *Crepidiastrum ameristophyllum* (Nakai), *C. grandicollum* (Koidzumi), *C. Keiskeanum* (Maximowicz), *C. koshunense* (Hayata), *C. lanceolatum* (Houttuyn), *C. lanceolatum* forma *typicum* (Makino), *C. lanceolatum* var. *latifolium* (Nakai), *C. linguaeifolium* (A. Gray), *C. Quercus* (Léveillé & Vaniot), *C. taiwanianum* (Nakai), *Izeris longirostra* (Hayata), *I. Matsumurae* (Makino), *I. microcephala* (Nakai), *I. nipponica* (Nakai), *I. sonchifolia* (Bunge), *I. sororia* (Miquel), *Paraixeris chelidoniifolia* (Makino), *P. denticulata* (Houttuyn), *P. denticulata* forma *typica* (Maximowicz), *P. denticulata* forma *pinnatipartita* (Makino), *P. denticulato-platyphylla* (Makino), *P. Yoshinoi* (Nakai).—*Roxana Stinchfield Ferris.*

1076. PENNELL, FRANCIS W. "Unrecorded" genera of Rafinesque—I. Autikon Botanikon (1840). Bull. Torrey Bot. Club 48: 89-96. 1921.—Certain of the papers by Rafinesque were not seen by the bibliographers who compiled the Index Kewensis; for example, his papers

in the American Monthly Magazine and his Autikon Botanikon. A list is here given of some 83 new genera published in the Autikon, naming the type species and the affinities of each genus.—P. A. Munz.

1077. PORSILD, MORTEN P. The structure and biology of arctic flowering plants. 14. Liliales. Meddel. om Grönland 37: 345-357. Fig. 1-8. 1920.—Notes are given concerning the distribution of several liliaceous arctic plants. Three species of *Tofieldia* are treated in detail with remarks on anatomy, morphology, and ecology.—E. B. Payson.

1078. R., A. B. The Cambridge British Flora. [Rev. of: Moss, C. E. The Cambridge British Flora. Vol. iii. Portulacaceae to Fumariaceae. xvi + 200 p., vi + 191 pl. University Press: Cambridge, 1920.] Nature 106: 337-338. 1920.—Since the previous volume, the editor has left England and the artist has died. Increased cost of production has necessitated raising the price to nearly 3 times that of the original. Notes by Moss on arrangement, limitations of families, etc., are of considerable interest, though sometimes difficult of appreciation by the ordinary student, who may consider the elevation of *Actaea* and *Paeonia* to the rank of families as puzzling and unnecessary. [See also Bot. Absts. 8, Entry 2232.]—O. A. Stevens.

1079. SALISBURY, E. J. [Rev. of: BEWS, J. W. The grasses and grasslands of South Africa. iv + 161 p., 24 fig., 1 map. P. Davis & Sons, Ltd.: Pietermaritzburg, 1918. Sci. Prog. [London] 13: 675-676. 1919.

1080. SARGEANT, JOHN. The trees, shrubs, and plants of Virgil. Small 8vo., vii + 149 p. B. H. Blackwell: Oxford, 1920.—The author has commented on the numerous plants to which reference is made in the works of Virgil and associated with them present day scientific botanical names.—J. M. Greenman.

SPERMATOPHYTES

1081. ANONYMOUS. Novitates africanæ. Ann. Bolus Herb. 3: 1-14. Pl. 1-2. 1920.—This article contains descriptions of new species by various authors. The following is a list of species described: *Diosma Marlothii* Dummer, *Barosma Bathii* Dummer, *Lebeckia elongata* Hutchinson, *Dolichos Pearsonii* Hutchinson, *Caesalpinia Pearsonii* L. Bolus, *Mesembrianthemum caespitosum* L. Bolus, *M. Strubeniae* L. Bolus, *M. purpureostylus* L. Bolus, *Geigeria pilifera* Hutchinson, *Helichrysum viscidissimum* Hutchinson, *Plumbago Pearsonii* L. Bolus, *Solanum rigescentoides* Hutchinson, *Clerodendron Teaguei* Hutchinson, *Homeria tilacina* L. Bolus, *H. bifida* L. Bolus, *H. speciosa* L. Bolus, *Watsonia Galpinii* L. Bolus, *Antholyza Watsonius* (Thunb.) L. Bolus, *A. Guthriei* L. Bolus, *A. Sladeniana* Pole-Evans, *Apicra rubiflora* L. Bolus, and *Agapanthus Walshii* L. Bolus.—E. P. Phillips.

1082. ARTHUR, J. C. New combinations for phanerogamic names. Torreya 21: 11-12. 1921.—Nine new combinations are proposed for names of plants cited as hosts for various species of Uredinales, viz.: *Cnidoscolus urens* (L.) and *Adenoropium angustifolium* (Griseb.), both transferred from *Jatropha*; *Vincetoxicum bifidum* (Hemsl.), *V. erianthum* (Decaisne) and *V. uniflorum* (HBK.), from *Gonolobus*; *Sphaeralcea arcuata* (Greene) from *Malvastrum*; *S. fasciculata* (Nutt.) from *Malva*; *Madronella viridis* (Jepson) from *Monardella*; *Coleosanthus megalodontus* (Greenm.) from *Brickellia*.—J. C. Nelson.

1083. BLAKE, S. F. Neomillspaughia, a new genus of Polygonaceae, with remarks on related genera. Bull. Torrey Bot. Club 48: 77-88. Pl. 1. 1921.—A key is given to the following genera: *Brunnichia*, *Antigonon*, *Gymnopodium*, *Neomillspaughia* gen. nov., and *Podopterus*. *Gymnopodium antigonoides* (Robinson) Blake and *G. ovatifolium* (Robinson) Blake, *Neomillspaughia paniculata* (Donn. Sm.) Blake, and *N. emarginata* (H. Gross) Blake are given as new combinations, and *Podopterus guatemalensis* Blake is described as a new species.—P. A. Munz.

1084. BOLUS, L. Notes on Compositae. Jour. Bot. Soc. South Africa 6: 9-11. 1920.

1085. BRITTON, NATHANIEL LORD. Descriptions of Cuban plants new to science. Mem. Torrey Bot. Club 16: 57-118. 1920.—New genera and species of flowering plants of Cuba are here published by the author and cooperating specialists. Unless otherwise indicated Dr. Britton is the author of the new names enumerated in the following list: *Paspalum Rocanum* Fr. Léon, *P. Edmondi* Fr. Léon, *P. acutifolium* Fr. Léon, *Cyperus camagueyensis*, *C. Underwoodii*, *Eleocharis Shaferi*, *E. minutissima*, *Fimbristylis ophitica*, *Hymenocallis praticola* Britton & Wilson, *Vanilla savannarum*, *Peperomia similis*, *P. cueroensis*, *P. sumideroensis*, *P. carnosa*, *P. sevilensis*, *P. trinitensis*, *P. neglecta*, *P. signaneana*, *P. Clementis*, *P. bullata*, *Portulaca cubensis* Britton & Wilson, *Hyperbaena acutifolia*, *H. littoralis*, *Xylopia Roigii* P. Wilson, *Persea Shaferi* P. Wilson, *Cassia benitoensis* Britton & Wilson, *Caesalpinia subglauca*, *C. myabensis*, *C. Hornei*, *Harpalyce macrocarpa* Britton & Wilson, *H. villosa* Britton & Wilson, *Bembicidium* Rydberg n. gen. of Leguminosae, *B. cubense* Rydberg, *Notodon cayensis* Britton & Wilson, *N. savannarum* Britton & Wilson, *Cafizaresia* n. gen. of Leguminosae, *C. cubensis* (*Piscidia cubensis* Urban), *Bradburya lobata* Britton & Wilson, *Erythrina venosa* Britton & Wilson, *Phaseolus savannarum* Britton & Wilson, *Erythroxylon Roigii* Britton & Wilson, *E. coriaceum* Britton & Wilson, *Elaphrium Shaferi* Britton & Wilson, *Bunchosia Leonis* Britton & Wilson, *Andrachne cuneifolia*, *Ramsdenia* n. gen. of Euphorbiaceae, *R. excisa* (*Phyllanthus excisus* Urban), *R. incrustata* (*Phyllanthus incrustatus* Urban), *Orbicularia scopulorum*, *O. foveolata*, *Roigia* n. gen. of Euphorbiaceae, *R. comosa* (*Phyllanthus comosus* Urban), *Conami ovalifolia*, *Dimorphocladium* n. gen. of Euphorbiaceae, *D. formosum* (*Phyllanthus formosus* Urban), *Phyllanthus Selbyi* Britton & Wilson, *P. dimorphus* Britton & Wilson, *Croton cueroensis* Britton & Wilson, *Argythamnia cubensis* Britton & Wilson, *Lasiocroton gracilis* Britton & Wilson, *L. cordifolius* Britton & Wilson, *Pera longipes* Britton & Wilson, *P. pallidifolia* Britton & Wilson, *Sapium cubense* Britton & Wilson, *Acalypha Hutchinsonii*, *Cyrrilla cubensis* P. Wilson, *Ilex Shaferi* Britton & Wilson, *I. Clementis* Britton & Wilson, *Salacia nipensis*, *Sarcomphalus cubensis*, *Rhamnidium oblongifolium* Britton & Wilson, *R. orbiculatum* Britton & Wilson, *R. Rocanum* Britton & Wilson, *Cissus Torreana* Britton & Wilson, *Malache calcicola*, *Maga cubensis* Britton & Wilson, *Melochia savannarum*, *M. nipensis*, *Ouratea affinis*, *O. Roigii*, *Marcgravia calcicola*, *Haemocharis benitoensis* Britton & Wilson, *Rheedia brevipes*, *Clusia callosa* Britton & Wilson, *Hypericum ophitica*, *Myroxylon rhombifolium* Britton & Wilson, *Lunania subcoriacea* Britton & Wilson, *L. elongata*, *Daphnopsis oblongifolia* Britton & Wilson, *Psidium nummularioides* Britton & Wilson, *P. navasense* Britton & Wilson, *P. bullatum* Britton & Wilson, *P. ophitica* Britton & Wilson, *P. saricola* Britton & Wilson, *Calyptanthus Clementis* Britton & Wilson, *C. Caroli* Britton & Wilson, *C. clarensis* Britton & Wilson, *Eugenia Cowellii* Britton & Wilson, *E. cabanasensis* Britton & Wilson, *E. moensis* Britton & Wilson, *E. havanensis* Britton & Wilson, *E. varia* Britton & Wilson, *E. Earlei* Britton & Wilson, *E. Rocana* Britton & Wilson, *E. clarensis* Britton & Wilson, *E. anafensis* Britton & Wilson, *E. ignota* Britton & Wilson, *E. Bakeri* Britton & Wilson, *Tamonea moensis*, *Calycogonium saxicola* Britton & Wilson, *Pachyanthus Clementis* P. Wilson, *P. mantuensis* Britton & Wilson, *Ossaea Shaferi* Britton & Wilson, *O. navasensis* Britton & Wilson, *O. nipensis* Britton & Wilson, *Kalmiella simulata* Britton & Wilson, *Rauwolfia lineariifolia* Britton & Wilson, *Echites minima* Britton & Wilson, *Exogonium incertum*, *Nama cubana* P. Wilson, *Varronia Shaferi*, *Bourreria Taylori*, *Rocheffortia stellata* Britton & Wilson, *R. cubensis* Britton & Wilson, *Duranta arida* Britton & Wilson, *Callicarpa Shaferi* Britton & Wilson, *C. Wrightii* Britton & Wilson, *C. cuneifolia* Britton & Wilson, *C. nipensis* Britton & Wilson, *Vitex Clementis* Britton & Wilson, *Pseudocarpidium Shaferi*, *Clerodendrum anafense* Britton & Wilson, *C. camagueyense* Britton & Wilson, *Salvia scabrata* Britton & Wilson, *S. cubensis* Britton & Wilson, *Hyptis Shaferi*, *H. rivularis*, *Physalis ignota*, *Solanum moense* Britton & Wilson, *Cestrum Wrightianum* P. Wilson, *C. Taylori* Britton & Wilson, *C. pinetorum*, *Brunfelsia Shaferi* Britton & Wilson, *B. clarensis* Britton & Wilson, *Cheilophyllum* Pennell n. gen. of Scrophulariaceae, *C. radicans* Pennell (*Stemodia radicans* Griseb.), *Silvinula* Pennell n. gen. of Scrophulariaceae, *S. humifusa* Pennell (*Herpestis humifusa* Griseb.), *Caconapea stemodioides* Pennell, *C. decumbens* Pennell (*Herpestis decumbens* Fernald), *Naiadothrix* Pennell n. gen. of Scrophulariaceae, *N. longipes* Pennell, *N. reflexa* Pennell (*Herpestis reflexa* Benth.), *N. myriophylloides* Pennell (*Herpestis myriophylloides* Benth.), *Encopella*

Pennell n. gen. of Scrophulariaceae, *E. tenuifolia* Pennell (*Encopa tenuifolia* Griseb.), *Anisantherina* Pennell n. gen. of Scrophulariaceae, *A. hispidula* Pennell (*Gerardia hispidula* Mart.), *Tabebuia camagueyensis* Britton & Wilson, *T. savannarum*, *T. Cowellii*, *Cotema* Britton & Wilson n. gen. of Bignoniaceae, *C. spiralis* Britton & Wilson (*Tecoma spiralis* Wright), *C. woodfredensis*, *C. apiculata*, *C. holguinensis*, *Gesneria yamuriensis* Britton & Wilson, *G. nipensis* Britton & Wilson, *G. clarensis* Britton & Wilson, *Pinguicula lignicola* Barnhart, *P. benedicta* Barnhart, *Utricularia mixta* Barnhart, *Tubiflora Shaferi* P. Wilson, *Machaeonia minutifolia* Britton & Wilson, *Scolosanthus lucidus*, *Psychotria Clementis*, *P. bermejaleensis*, *P. moensis* Britton & Wilson, *P. toensis* Britton & Wilson, *Mitracarpum Fortunii* Britton & Wilson, *Aster Leonis*, *Gundlachia apiculata* Britton & Blake, *G. foliosa* Britton & Blake, *G. cubana* Britton & Blake, *Erigeron Taylori* Britton & Wilson, *E. Earlei* Britton & Wilson, *Borrchia cubana* Britton & Blake, *Spilanthes montana* Britton & Blake, *Chaptalia comptonioides* Britton & Wilson, *C. Shaferi* Britton & Wilson, and *C. Rocana* Britton & Wilson.—*J. M. Greenman.*

1086. CHASE, AGNES. The Linnaean concept of pearl millet. *Amer. Jour. Bot.* 8: 41-49. 1921.—Owing to the confusion of names for pearl millet, the author has made a careful analysis of the Linnaean names involved in the problem. To bring order out of this confusion, she recommends rejection of the names *Panicum americanum* and *P. cynosuroides*; and suggests appropriate restrictions for the names *Panicum alopecuroides*, *P. glaucum*, and *Holcus spicatus*. She believes that pearl millet furnishes a good example of the "Linnaean concept of species," so frequently urged by botanists who are not systematists.—*E. W. Sinnott.*

1087. COULTER, J. M. New genera. [Rev. of: (1) NAKAI, TAKENOSHIN. *Genus novum Oleacearum in Corea media inventum*. *Bot. Mag. Tôkyô* 33: 153-154. 1919 (see *Bot. Absts.* 5, Entry 2386); (2) PENNELL, F. W. A brief conspectus of the species of *Kneiffia*, with the characterization of a new allied genus. *Bull. Torrey Bot. Club.* 46: 363-373. 1919 (see *Bot. Absts.* 5, Entry 2390).] *Bot. Gaz.* 69: 96. 1920.

1088. DUMMER, R. A. A further contribution to our knowledge of the genus *Agathosma*, Willd., containing descriptions of 23 new species and 3 new varieties. *Ann. Bolus Herb.* 3: 44-62. 1920.—The new species and varieties, all from South Africa, described in the present paper are: *Agathosma humilis* Sond. var. *capitata*, *A. stilbeoides*, *A. Foleyana*, *A. scaberula*, *A. krakadouwensis*, *A. tulbaghensis*, *A. decora*, *A. decora* var. *Buchu*, *A. decora* var. *pseudohybrida*, *A. Sonderiana*, *A. Marlothii*, *A. Keetii*, *A. perplexa*, *A. Pillansiana*, *A. craspedota* E. Mey. var. *eglandulosa*, *A. Pattisonae*, *A. utilis*, *A. mucronulata* Sond. var. *Rudolphii*, *A. Tugwelliae*, *A. Phillipsii*, *A. riversdalensis*, *A. formosissima*, *A. cedrimontana*, *A. Bodkinii*, *A. gracilipetala*, *A. bicolor*, *A. paludosa*, and *A. muizenbergensis* var. *planitiensis*.—*J. M. Greenman.*

1089. DUMMER, R. A. A note on, and a description of, four new species and two new varieties of the genus *Adenandra*, Willd. *Ann. Bolus Herb.* 3: 40-43. 1920.—The plants described in this article are all from the Cape Province of South Africa; they are: *Adenandra Fryii*, *A. caledonensis*, *A. viscida* E. & Z. var. *ciliata*, *A. Pottsii*, *A. biseriata* Meyer var. *gracilior*, and *A. Guthriei*.—*J. M. Greenman.*

1090. KUDO, YUSHUN. *Prunellopsis*, Labiatae genus novum. [*Prunellopsis*, new genus of Labiatae.] *Bot. Mag. Tôkyô* 34: 181-184. 1920.—A new genus, *Prunellopsis*, allied to *Prunella* and *Dracocephalum*, is described from Japan with one species, *P. prunelliformis* Kudo.—*Rozana Stinchfield Ferris.*

1091. MAIDEN, J. H. A critical revision of the genus *Eucalyptus*. Vol. V. Part 3. P. 71-101, pl. 176-179. William Applegate Gullick: Sydney, 1920.—The present part contains descriptions, critical notes, and illustrations of the following species: *E. ficifolia* F. v. M., *E. calophylla* R. Br., *E. hamaetoxylon* Maiden, *E. maculata* Hook., *E. Mooreana* (Fitzgerald) Maiden, *E. approximans* Maiden, and *E. Stowardi* Maiden.—*Ibid.* Part 4. P. 103-131, pl. 180-183. February, 1921. This part treats the following species: *Eucalyptus perfoliata*

R. Br., *E. ptychocarpa* F. v. M., *E. similis* Maiden, *E. lirata* (Fitzgerald) Maiden n. sp., *E. Baileyana* F. v. M., *E. Lane-Poolei* Maiden, *E. Ewartiana* Maiden, *E. Bakeri* Maiden, *E. Jacksoni* Maiden, and *E. eremophila* Maiden.—*Ibid.* Part 5. P. 133-160, pl. 184-187. 1921. This part continues with a similar treatment of *Eucalyptus erythrocorys* F. v. M., *E. tetradonta* F. v. M., *E. odontocarpa* F. v. M., *E. capitellata* Smith, *E. Camfieldi* Maiden, *E. Blaxlandi* Maiden & Cambage, and *E. Normantonensis* Maiden & Cambage.—*J. M. Greenman.*

1092. MAIDEN, J. H. The forest flora of New South Wales. Vol. VII. Part 5. P. 193-237., pl. 224-247, 12 photographic illustrations. William Applegate Gullick: Sydney, 1920.—Six species are elaborated in this part, namely, *Archontophoenix Cunninghamiana* Wendl. & Drude, *Eucalyptus dumosa* A. Cunn., *Acacia rigens* A. Cunn., *A. Havilandi* Maiden, *Eremophila Mitchellii* F. v. M., and *E. Sturtii* R. Br. Each species is accompanied by a detailed description, one or more illustrations, and pertinent notes. An appendix contains a chapter on "Insects and Timber Trees."—*J. M. Greenman.*

1093. MIYOSHI, MANABU. Untersuchungen über japanische Kirschen, I. [Investigations of Japanese cherries, I.] Bot. Mag. Tôkyô 34: 159-177. 1920.—The synonymy and relationships of the true and false equinoctial cherries (species blooming at the spring equinox) are discussed. One new species, *Prunus sacra*, and numerous new forms are named and several new names are proposed.—*Roxana Stinchfield Ferris.*

1094. MIYOSHI, MANABU. Weitere Mitteilungen über die Hängekastanie. [Further contributions concerning the weeping chestnut.] Bot. Mag. Tôkyô 34: 185-186. 1920.—The author states that specimens of the weeping chestnut, *Castanea pubinervis* C. Schn. var. *pendula* Miyos., grown from seed show the characteristic weeping form, indicating that the variety is fixed. Additional distributional notes are given.—*Roxana Stinchfield Ferris.*

1095. PHILLIPS, E. P. The genus *Borbonia* Linn. (Leguminosae). South African Jour. Sci. 16: 397-410. Pl. 34-38, and map. 1920.—The author gives a synoptical revision of *Borbonia*, recognizing 15 species and several varieties. The following are described as new: *B. lanceolata* L. var. *robusta*, *B. lanceolata* L. var. *villosa*, *B. undulata* Thunb. var. *ciliata*, and *B. multiflora*.—*J. M. Greenman.*

1096. PHILLIPS, E. P. Three noteworthy species of plants from South Africa. South African Jour. Sci. 16: 429-431. Pl. 39. 1920.—Critical notes are recorded on *Protea rhodantha* Hook. f., *Kniphofia Northiae* Baker, and *Euphoria Monteiro* Hook. f.—*J. M. Greenman.*

1097. PILLS, N. S. Stapeliae. Jour. Bot. Soc. South Africa 6: 5-6. 1920.

1098. WORDSWORTH, R., J. HUTCHINSON, F. BOLUS, AND L. BOLUS. Flowering plants collected in South-West Africa by the Percy Sladen Memorial Expedition, 1915-16. Ann. Bolus Herb. 3: 15-37. 1920.—An annotated list is presented of the flowering plants collected on the expedition mentioned in the title. No new species are recorded.—*J. M. Greenman.*

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. LIVINGSTON, Editor

S. F. TRELEASE, Assistant Editor

1099. RAMÍREZ, ROMÁN. *Asclepiadea hulera*. [A rubber plant of the Asclepiadaceae.] Rev. Agric. [Mexico] 4: 508-509. 1 fig. 1919.—A brief description is given of *Cryptostegia madagascariensis*, a plant yielding low-grade rubber.—*John A. Stevenson.*

1100. STRAND, E. [Rev. of: SCHMIDT, H. Geschichte der Entwicklungslehre. (History of the theory of development.) 549 p. Alfred Kröner: Leipzig, 1918.] Arch. Naturgesch. Abt. A. 86: 184. 1920 [1921].—The author presents a consideration of the history of the evolutionary concept; its bearing on cosmology, chemistry, geology, and anthropology, as well as on biology; its relation to the theory of special creation; and its effect upon philosophical thought.—*C. E. Allen.*